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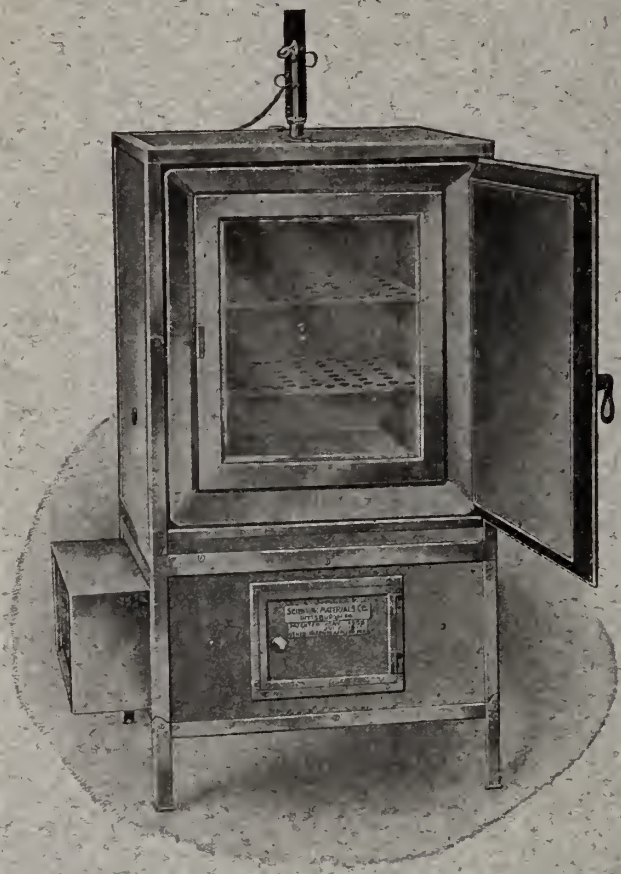
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SOME PHYSICAL CHARACTERISTICS OF MALE GARMENT-WORKERS OF THE CLOAK AND SUIT TRADES, BASED UPON 2,107 PHYSICAL EXAMINATIONS MADE IN NEW YORK, N. Y.

J. W. Schereschewsky,
Surgeon, United States Public Health Service.

Read before the Vital Statistics Section of the American Public Health Association, Jacksonville, Fla., December, 1914.

IN CONSIDERING the effect of occupations upon the health, it is necessary to study the average physical status of workers in the occupations under consideration. The Public Health Service is now engaged in making studies of this character, an investigation having already been completed by the Service during the past summer under the writer's direction, as to the physical condition of workers engaged in one of the typical industries, that of garment-making.

This investigation was undertaken at the solicitation of the Joint Board of Sanitary Control of the cloak and suit, dress and shirt-waist trades of New York. The object of the investigation was to examine into the condition of the health of male and female workers in this occupation, as well as into lighting and ventilating conditions in shops of the trade, with a view to making any necessary recommendations for the sanitary improvement of the industry.

During the course of the investigation, over 2,000 male and 1,000 female garment-workers were physically examined. It has not been practicable, for lack of time, to tabulate as yet the results of the physical examinations of female garment-workers. These results, however, in regard to the males, have been tabulated. I have been requested by the Secretary of the Section on Vital Statistics to present a paper on some of the results of the examination.

While it is impossible, in the space of time at my disposal, to give more than a summary of the physical characteristics of these garment-workers, it is thought that the data herewith presented may be of interest to the Section. It is evident that their comparative value will be much enhanced when the Public Health Service shall have obtained similar data for other occupations. This the Service hopes to do as facilities permit.

Type of Physical Examination Made.—The type of physical examination made was thorough. An aver-

age of 40 to 50 minutes was spent in the examination of each individual. Besides examining the condition of the viscera, observations were made as to the height, weight, circumference of the chest, at rest, at full inspiration, at expiration, the abdominal circumference, vital capacity, strength of grip of right and left hands, of pulse rate, of systolic and diasystolic blood pressure, hemoglobin, condition of the teeth, state of the vision, of the orifices of the body, condition of bones and joints and extremities, the incidence of sugar and albumen in the urine, and in 273 instances the blood was tested for the presence of syphilitic antibodies. Arrangement was also made through the kindness of the faculty of Cornell Medical School for the cooperation of that institution, through which the facilities of their laboratories were placed at the disposal of the Service for chemical investigations as to the composition of the air in the shops of the garment trades, and also in the making of special examinations of workers at the Cornell dispensary, either for special conditions requiring further examination, or when the nature of the disease or the defect could not be made out at the primary examination.

Results of the Physical Examination.—Social Data.

Classification of Male Garment-Workers.—For the purpose of classification, the workers of the garment trades may be divided into the 5 following groups:

1, cutters; 2, operators; 3, finishers; 4, pressers, and 5, miscellaneous workers (tailors, sample makers, button-hole makers, bushelmen, and the like). These perform the following duties: Cutters cut out the garments from bolts of cloth according to the patterns furnished them; operators sew the pieces thus cut out by means of electrically-driven sewing machines, each operator making the entire garment, so far as this can be accomplished, on the machine; finishers perform in general such operations upon the garments as have to be done by hand, such as basting, overcasting of seams, sewing on buttons and the like; the pressers, as their name indicates, press the garments whenever this is required. Of these, two classes of workers, namely, cutters and pressers, work in the standing posture, while two, namely the operators and finishers, work sitting. There are thus important postural differences between the various classes of garment-workers which are not without an effect upon them. In addition to this there is also a difference in the wage scale of these workers, two of the groups (operators and finishers) being paid on a piece-work basis, while the remaining two groups (cutters and pressers) are paid by the week.

Number of Each Class Examined.—The following number of each group was examined: Cutters, 48; operators, 976; pressers, 720; finishers, 280; miscellaneous workers, 79; total, 2,091.

Race.—Of the garment-workers examined, 96.6 per cent. were of the Jewish race, 3.08 per cent. were Italians, and 0.19 per cent. were Poles.

Nativity.—80.4 per cent. of the garment-workers examined were born in Russia; 15.2 per cent. were born in Austria; 1.19 per cent. were born in Roumania; 0.047 per cent. were born

in England; 0.047 per cent. were born in Turkey; .047 per cent. were born in Germany, and 3.09 per cent. were born in Italy. In two instances, only, were the workers born in the United States.

Nativity; Length of Time in the United States.—The average length of time of the workers in the United States were as follows: Cutters, 8.62 years; operators, 10 years, pressers, 8.35 years; finishers, 8.69 years; miscellaneous workers, 9.05 years. The average length of time in the United States for all the garment-workers examined was 9.25 years.

Length of Time in Special Occupation.—The workers examined had followed their special occupations for the following average time: Operators, 9.48 years; pressers, 7.76 years; finishers, 8.56 years; cutters, 6.58 years, miscellaneous workers, 17.4 years. The average time spent in their special occupations, for all male garment-workers, was 8.99 years.

The indications, therefore, are that, with the exception of the small group of miscellaneous workers, the male garment-workers took up their special occupations shortly after their arrival in the United States.

Civil Condition.—In regard to the civil condition, the following percentages of male garment-workers were respectively single and married:

	Per cent. married.	Per cent. single.
Operators	66.5	33.5
Pressers	83.28	16.72
Finishers	81.00	19.00
Cutters	29.00	71.00
Miscellaneous workers	81.6	17.4

Fertility of Married Garment-workers.—The following observations as to fertility were made in the case of married garment-workers: The total number of children born, to 1,518 married garment-workers, was 4,878, of which 14,096 were living and 882 dead at the time of the examination. The percentage of children who died to the total number born was, therefore, 15.82 per cent.

The average of all children born to married garment-workers was thus 13.21 per married workers. The average number of children living at the time of the examination was 2.7 children per family, leaving an average of 1.57 children per family dead, prior to the time of the examination. Examining the group of fertility and mortality of married garment-workers, the following results were noted:

Married Operators (639).—Average number of living children per operator, 2.39; of children dead, .31; of total children born, 2.70.

Married Pressers (578).—Average number of living children per presser, 2.83; average number of children dead, .58; average total children born, 3.41.

Married Finishers (225).—Average number of living children per finisher, 3.70; average number of children dead, .93; average total number of children born, 4.63.

Married Miscellaneous Workers (48).—Average number of children living, 2.66; of children dead, .45; of total children born, 3.11.

Married Cutters (14).—Average number of living children, per cutter, .71; number of children dead, .21; total number of children born per cutter, .92.

The percentage of children dead to

those alive was as follows for these groups: Operators, 11.7 per cent.; pressers, 17.11 per cent.; finishers, 21.7 per cent.; cutters, 23 per cent.; and miscellaneous, 17 per cent. It is thus seen that the group presenting the highest fertility, namely, the finishers, had also the greatest mortality among the children born to them with the exception of the cutters, in which group the number of observations is too small for basing conclusions.

Income of Garment-Workers.—In determining the annual amounts earned by garment workers, reliance had to be placed upon their individual statements. These statements furnish the following results:

Miscellaneous workers.	$789
Cutters	720
Operators	666
Pressers	562
Finishers	486

The higher wages earned by the miscellaneous workers are due to the fact that this group contained a large proportion of special qualified workers, some of whom earned wages to the amount of $1,500 annually.

The average income of all male garment-workers was $611.50 per annum. The annual income of garment-workers is not in direct proportion to the weekly wages, for the reason that employment is not continuous in the cloak and suit trade. This occupation presents a marked seasonal fluctuation in activity, the shops running full-time and over-time in the busy spring and fall seasons, while during the summer months and the middle of winter, there is relatively little work to do.

Hours of Labor.—The hours of work for all garment-workers in the cloak and suit trade in New York are 54 per week with a half day on Saturday.

Physical Data.

Age of Garment-Workers.—The average age of all the male garment-workers examined was 32.26 years. The age by groups was as follows: Cutters, 25.36 years; operators, 29.53 years; pressers, 34.59 years, miscellaneous workers, 35.04 years; finishers, 35.6 years. The following table gives the age distribution in 5-year age groups:

Age.	No.	Per cent.
17–19	38	1.82
20–24	382	18.83
25–29	522	25.00
30–34	447	21.4
35–39	303	14.5
40–44	207	9.9
45–49	92	4.4
50–54	59	2.82
55–59	28	1.34
60–64	8	.382
65–69	4	.191
70–74	1	.047

It will be seen that 79 per cent. were between 20 and 34 years old, and over 90 per cent. were between 20 and 40 years of age. The maximum age incidence was found between the ages of 30 and 34 years. So far as the maximum age incidence in the groups is concerned, in operators this fell between 25 and 29; in pressers, between 30 and 34; in cutters, between 20 and 24; in finishers the age incidence was nearly equal for the age-periods from 20 to 24, 25 to 29, 30 to 34, and 35 to 39.

Height.—For various reasons it was impracticable to measure the heights of male garment-workers otherwise than in their shoes. The average heights

recorded are therefore about seven eighths of an inch in excess of the actual height. The average height of all male garment-workers examined was found to be 65.46 inches. In the groups the following average heights were found:

Pressers, 65.82 inches,
Cutters, 65.73 inches,
Operators, 65.35 inches,
Miscellaneous workers, 65.3 inches,
Finishers, 64.69 inches.

The following table gives the distribution of the heights observed:

Height between		Per cent.
57–58 inches,	1	.047
58–59	1	.047
59–60	5	.239
60–61	28	1.34
61–62	70	3.35
62–63	159	7.62
63–64	266	12.70
64–65	338	16.2
65–66	381	18.24
66–67	343	16.42
67–68	232	11.1
68–69	131	6.28
69–70	84	4.02
70–71	30	1.44
71–72	15	.72
72–73	3	.141

It will be seen from this table that the maximum incidence of height fell between 65 and 66 inches. In 1,328 instances or in over 62 per cent. the height fell between 63 and 67 inches, and in 75 per cent. of the instances, the height was between 63 and 68 inches.

In considering the average heights of the various groups of garment-workers it will be seen that the pressers are the tallest, followed in order by the cutters, operators, miscellaneous workers, and lastly the finishers. The difference between the height of this latter and the tallest group (pressers) is 1.13 inches.

Average Weights of Garment-Workers.—It was also found impractical to weigh the garment workers naked. All weights were taken with the individual clad in his shoes and trousers, the body being naked from the waist up. The weights so obtained were on an average about $3\frac{1}{2}$ pounds in excess of the actual weight. The average weight for all male garment-workers was found to be 141.21 pounds. The average weights according to groups were as follows:

Miscellaneous workers.....146.8 lbs.
Pressers 146.43 lbs.
Operators 138.70 lbs.
Finishers 136.48 lbs.
Cutters 135.99 lbs.

Again it will be seen that the finishers manifest an inferiority in weight, as they do in height, to both operators and pressers. Although the cutters are the lightest of the groups, the low average age of the cutters and their standing position, together with the nature of their work, which does not call for any great muscular exertion, would probably account for their lighter weight. In the groups represented by large numbers the pressers manifest a decided superiority in weight as they do in height. In this group of workers we have an occupation which entails considerable muscular exertion in handling the heavy pressing iron, together with the muscular effort required by the maintenance of the erect posture.

The following table shows the average weights of garment-workers observed for each height:

Height between	Weight in lbs.
57–58 inches	142.75
58–59 inches	115.00
59–60 inches	118.75
60–61 inches	117.70
61–62 inches	126.23
62–63 inches	131.11
63–64 inches	134.00
64–65 inches	137.25
65–66 inches	141.27
66–67 inches	143.68
67–68 inches	148.73
68–69 inches	153.17
69–70 inches	156.00
70–71 inches	167.35
71–72 inches	161.70
72–73 inches	151.50

This table shows a fair correlation except for heights between 57 and 58 inches, 71 and 72 inches, and 72 to 73 inches. This lack of correlation is, of course, due to the small number of observations at these heights. Excluding the heights in which the observations are too few to be considered, it was found that the average increment in weight for each inch of added height was 4.97 pounds, between 61 and 71 inches.

Circumference of Chest.—Three measurements were taken of each chest at the nipple line; at rest; at full inspiration, and at forced expiration.

The following table gives the averages found:

CIRCUMFERENCE OF CHEST OF MALE GARMENT WORKERS.

	Chest at rest.	Inspiration.	Expiration.	Expansion.
Pressers	36.00 in.	37.24 in.	35.60 in.	1.64
Miscellaneous garment-workers	35.9	37.14	35.35	1.79
Operators	34.90	36.21	34.40	1.81
Finishers	34.61	36.00	34.37	1.63
Cutters	34.17	35.72	33.86	1.86
General average	35.27	36.57	34.82	1.75

It will be seen from the above table that the pressers have the largest chests, followed in order by the miscellaneous worker, operators, finishers, and cutters. The highest expansion, however, was found in the cutters, and next to these, the operators. This is doubtless due to the low average age in these groups, which would be accompanied by a greater mobility of the thoracic walls.

Vital Capacity.—The average vital capacity of cutters was 238.2 cubic inches; of operators, 230.1 cubic inches; of pressers, 227.9 cubic inches; of miscellaneous workers, 212.8 cubic inches and finishers, 204.8 cubic inches.

It is seen from the above, that the finishers are again inferior to the other groups of garment-workers. It is worth noting that pressers, though superior to operators, both in height

and average circumference of chest, are their inferiors in average chest expansion. The youngest group of workers, *i. e.*, the cutters, showed the greatest average chest expansion and vital capacity. The operators, next in point of age, showed the second highest chest expansions and vital capacities. The greater average age of pressers as well as the presence among them of a larger number of cases of pulmonary emphysema is, in all likelihood, the cause of their lesser vital capacity and chest expansion, as compared to the younger groups of operators and cutters. The maximum observation of vital capacity, however, *i. e.*, 340 cubic inches, occurred in a presser. The vital capacity measurements showed a better correlation to height than the chest measurements.

Abdominal Circumference.—The abdominal circumference was taken at the level of the umbilious. The average was found to be 32.42 inches. The difference between the average chest and average abdominal circumference was, therefore, 2.85 inches. The cutters, by reason of their youth, showed the lowest average abdominal circumference of 30.5 inches. Then followed, in order, operators with an average of 32.18 inches; finishers with 32.56 inches; pressers with 32.98 inches, and miscellaneous workers with 33.85 inches. The excess of chest over abdominal circumference, therefore, was 3.67 inches for cutters, 3.02 inches for pressers, 2.72 inches for operators, and 2.05 inches for both finishers and miscellaneous workers. It is thought that the standing posture, at work, of both cutters and pressers, has an influence in determining the lesser relative circumference of the abdomen as compared to the chest, in these two groups of workers.

Strength of Grip.—The average strength of grip of male garment-workers was found to be 94.5 pounds for the right and 85.5 pounds for the left hands. Cutters had the highest average grip with 101.4 pounds in the right hand and 89.4 pounds in the left hand. Pressers came next with 96.2 and 87.2 pounds respectively; then operators with 94 pounds in the right and 84.9 pounds in the left. Miscellaneous workers with 88.5 in the right and 78.5 pounds in the left, while finishers showed 79.15 pounds in the right and 70.25 pounds in the left hands. The maximum observation was 190 pounds in the right hand and 160 pounds in the left hand. All the averages given above are undoubtedly rather low. The finishers manifested the same inferiority in strength of grip that they showed in other measurements.

Evidences of Protection against Smallpox.—The garment-workers, as a class, showed a high degree of protection against smallpox by vaccination. In 2,065 garment-workers in whom this observation was made, 103 or very nearly 5 per cent. showed no evidence of previous successful vaccination. In 1,902 workers, or 92.1 per cent., good vaccination scars were present, while 60 individuals, or 2.9 per cent., had been protected by a previous attack of smallpox.

Pulse rate, Blood-pressure and Hemoglobin.—The average pulse frequency observed among garment-workers was

76.8 with the following averages for the several groups: Finishers, 76.12; operators, 76.22; miscellaneous workers, 76.5; pressers, 77.96; cutters, 78.1. In very nearly 80 per cent. of the observations the pulse-rate lay between 60 and 89.

Blood Pressure.—The average systolic blood pressure of 2,066 male garment-workers was 125.66 mm. of hg. The average diasystolic pressure of 2,051 workers was 84.53 mm. The average pulse pressure observed was, therefore, 41.12 mm. This is somewhat in excess of the usual average for pulse pressure which is commonly 25 to 30 mm. The auscultatory method was used in making these observations. The maximum systolic blood pressure observed was 260 mm., the maximum diasystolic pressure, 165 mm. Pressers had the highest average systolic blood pressure of 129.25 mm. Then followed, in order, finishers with 125 mm., operators with 123.4 mm., cutters with 122.3 mm., and miscellaneous workers with 120.1 mm.

Hemoglobin.—In view of the necessity for using some rapid method in determining the percentage of hemoglobin, the Tallqvist scale was used. The scales employed were calibrated by comparing readings made by them against readings with two other forms of hemoglobinometers (Dare's and Gower's). They were found to give readings on an average of 10 per cent. lower than these instruments for values between 80 and 100 per cent. About 10 should therefore be added to the percentages given herewith.

Computed according to the Talqvist scale, the average percentage of hemoglobin of 1,998 male garment-workers in whom this was estimated was 86.79 per cent. The minimum reading found was 65 per cent. In 101 instances, hemoglobin percentages of below 80 were observed.

According to groups, pressers had the highest average percentage of hemoglobin with 87. Miscellaneous workers came next with 86.9, followed in order by operators with 86.8, cutters with 86.7, and finishers with 86. Although pressers had the highest average hemoglobin, percentages below 80 were observed more frequently in this group than in others. This group also furnished the individual with the minimum percentage of hemoglobin observed. It is possible that there may be some relation between the greater frequency of low hemoglobin percentages among pressers and their exposure to carbon monoxid gas from gas-irons. This point is being investigated by the Service.

Development and Nutrition.—While the personal equation of the examiner must influence, to a certain extent, the classification of workers according to the state of their development and nutrition, such observations are not without value.

The following table shows how male garment-workers were classified by the examiners as to the state of their development and nutrition:

Workers.	Development.			Nutrition.		
	Good.	Fair.	Poor.	Good.	Fair.	Poor.
Operators	248	462	255	473	331	161
Pressers	284	299	135	424	215	79
Finishers	45	121	113	117	104	58
Cutters	14	21	13	22	21	5
Miscellaneous	25	30	24	40	24	15
Total	616	933	540	1,076	695	318
Per cent.	29.5	44.6	25.9	51	33.5	15.5

It will be seen from the above table that the state of development among garment-workers, is not on a par with that of the nutrition, a good state of the latter being considerably more frequent than the former. Pressers were the best developed and best nourished class of garment-workers, some of them possessing even magnificent muscular development. Very excellent physical types were also encountered among the operators. 39.5 per cent. and 59.1 per cent. among pressers, 29.2 per cent. and 45.9 per cent. among cutters; 25.7 per cent. and 49 per cent. among operators; 16.1 per cent. and 42 per cent. among finishers presented respectively good development and good nutrition. The finishers, therefore, furnished the most unfavorable comparison with the other groups from the standpoints of development and nutrition.

General Physique of Garment-Workers.—In considering the impressions derived from the examination of garment-workers, it was found the pressers were the most robust from a physical standpoint. The finishers were decidedly inferior to all the others. This is but natural, as the work of the presser requires considerably more muscular energy than that of the workers. The work of operators, too, while calling for no great muscular exertion, requires concentration, alertness, and speed, in order to earn a high wage. The work of the finisher, however, demands these qualities to a much lower degree; therefore, we find in the garment trade, a gravitation of those whose efficiency is low, either by reason of age or physical inferiority to this class of work. This is ample to account for the relatively poorer showing of this class of garment-workers.

Defects of Garment-Workers.—It will be impossible within the limits of this paper to enter into detailed discussion of the defects observed in the course of the investigation. These will be fully described and discussed in the full report of the investigation which will be published later. *I will state, however, that the physical examination developed the presence of no one disease which can be said to be peculiar to garment-workers.* The effect of this trade

upon the health is that of any sedentary occupation, namely, that defects, or neglect of personal hygiene are intensified, in their influence upon the individual by the confining and sedentary nature of the occupation. This industry, in the case of the piece-workers, at least, presents, also, the following unsatisfactory conditions. During the busy season, the workers drive themselves at top-speed, in order to earn as much money as possible, to tide them over the slack seasons, while, during the dull periods, they are without sufficient occupation to keep up their interest. Such conditions are productive of considerable mental stress, the worker, during the busy season, overdriving himself, and spending the slack season in wondering if work will be forthcoming in the future.

This condition of affairs is reflected in the relatively large number of operators found to be distinctly neurasthenic, or of neurasthenic tendency.

The number of physical defects observed in individuals, usually the result of neglect of personal hygiene, was very large. Not over 2 per cent. of the workers examined were free from defects. The average number of defects observed was between 4 and 5 per person. Without entering into details at this time, it should be stated that the majority of these defects were of a correctible nature. Chief among them were chronic catarrhal conditions of the naso-pharynx, defective vision, defective teeth, weak or flat feet.

Tuberculosis was undoubtedly the most serious chronic disease found and was present in about 3 per cent. of those examined. Neglect of the teeth was habitual among garment-workers, and the evil consequences of inattention to this department of personal hygiene were apparent. The average number of efficient teeth in the mouths of garment-workers was but 24.63, which gives a deficiency from normal efficiency per worker of 7.37 teeth, or about 23 per cent. of the number normally present in the mouth. Hernia and varicose veins of the legs seemed especially prevalent among pressers, doubtless due to their standing posture.

As a whole, postures assumed by garment-workers were extremely defective. Yet in those who had had military training in their youth, good postures were relatively common. The effect of this training, therefore, had been permanent. The evil effects of defective postures upon the physical condition are well known, and will not be entered into here.

Suffice it to say, in conclusion, that a large part of the ills suffered by garment-workers, apart from defective eyesight, in the occurrence of which poor shoplighting doubtless plays a part, are due to neglect of personal hygiene. This indicates the importance of instruction in such matters in the curriculum of our public schools. I would also emphasize the necessity for the postural training of children, as well as for regular medical school inspection, and dental school clinics. The beneficial effect of such measures, applied in childhood, may be expected to extend over the lifetime of the individual.

RECENT METHODS OF BACTERIAL AIR ANALYSIS.

G. L. A. Ruehle,
New York Agricultural Experiment Station, Geneva, N. Y.

Read before the Laboratory Section, American Public Health Association, Jacksonville, Fla., December 3, 1914.

IN A series of studies on the effect of various barn practices upon the germ content of milk, it fell to the lot of the writer to work upon the problem of the relation between the number of bacteria in stable air and the amount of contamination of the milk by air bacteria. For the past two years considerable time has been given to this problem. The necessary data were gathered from two points of view: (1) that of the effect of the number of bacteria in a known volume of air upon the milk and (2) that of the effect on the milk of the number of bacteria precipitating upon a known area in a definite period of time.

But before attacking the main problem it was thought desirable to test out the methods of bacterial air analysis in vogue, with the result that changes were made in the usual procedures that are believed to be improvements over the current methods. The first results given will be of comparisons obtained with three methods of determining the number of bacteria in a liter of air. Then follow the results of comparisons between two methods of determining the amount of bacterial precipitation occurring on a known area in a definite space of time.

The three methods of filtering air for germ content tested by the writer were the water-filtration method of Rettger,* the sand-filtration method recommended by the "Committee on Standard Methods of Air Analysis of the American Public Health Association,"† and a modification of the latter, devised in this laboratory.

Description of Filters Studied.—Rettger's method is a modification of Miquel's aëroscope. The filtering agent is 5 ccm. of physiological salt solution which is plated in aliquot portions after the air is allowed to bubble through the liquid. The description of the aëroscope may be given in Rettger's own words as follows: "The entire special apparatus consists of a glass tube with a small round bulb at one end (fig. 1). The bulb has eight or ten small perforations which serve the purpose of allowing the air to pass through at a rapid rate and yet divide the gas to such an extent that every particle of it is brought into close contact with the filtering fluid. This glass tube or aëroscope is fitted into a small thick-walled test-tube by means of a rubber stopper, which also bears besides the aëroscope a short glass tube bent at right angles. The upper end of the aëroscope is bent at an angle of about

*L. F. Rettger, "A new and improved method of enumerating air bacteria." Jour. Med. Research, 22: 461–468. 1910.

†Progress report of Committee on Standard Methods for the Examination of Air. Amer. Jour Public Health, 3: 78–86. 1913



Fig. 1.

forty-five degrees in order to prevent bacteria and particles of dust from falling into the open end of the tube and still permit of the tube being drawn through the stopper without difficulty."

The standard method is a modification of Petri's sand-filtration method. A layer of fine sand 1 cm. in thickness is supported within a glass tube (fig. 2) 70 mm. in length and 15 mm. in diameter upon a layer of bolting cloth, which in turn is supported by a rubber stopper. Through a perforation in the rubber stopper there passes a tube 6 mm. in diameter and 40 mm. in length. This is the part of the apparatus which is attached to the aspirator bottle. The upper end of the sand filter carries a perforated cork stopper through which passes a tube of the same dimensions as the lower one. This is bent at an angle of 45° to prevent precipitation of dust and bacteria into the tube. The sand is shaken into 10 ccm. of sterile water and aliquot portions of this plated on nutrient agar.



Fig. 2.

The modification of this method (fig. 3) previously mentioned differs



Fig. 3.

from the standard tube in no way except that the lower rubber stopper and the bolting cloth supports are eliminated and the small tube is fused into the larger one, while the upper rubber stopper is replaced by one of cork. The layer of sand is supported by a layer of cotton resting on the shoulder at the junction of the large and small tubes. This tube is very similar to

the one used by Koning* in 1906 though he used much coarser sand. As far as the writer knows, this form of aëroscope has never been employed by others.

I. Comparison of Results with Three Methods of Filtering Air.

The filtering efficiency of the aëroscopes was determined by setting them up in tandem so that the air could be drawn through both of the filters. From the number of bacteria found in each of the tubes it was a simple matter to calculate the efficiency of the filters, since the number of bacteria in the second tube represented the proportion of the whole number not caught by the first tube. Great care had to be taken to prevent leakage about the joints between the two aëroscopes. In addition to these efficiency tests, experiments were also carried out in another way. These consisted of comparisons between the numbers of bacteria obtained by each method, when the aëroscopes were set up side by side, equal amounts of air being drawn through each filter in equal periods of time. These two types of tests were carried out for the most part simultaneously, but for the sake of convenience, the results of the percentage efficiency tests will be discussed first and then the results of the comparative tests. All of the figures given are from averages of from 20 to 25 tests except one which included only nine tests. The results of all the work on the filter tubes cannot be given here, but only general summaries of the most instructive tests. Anyone especially interested will find the details in a Bulletin of the New York Agricultural Experiment Station soon to be issued.

The highest average filtering efficiency obtained by the use of the standard sand filter in any series was 92 per cent. and the lowest average for a series was 90 per cent. Individual cases varied between wide extremes. Sometimes the filter seemed to be 100 per cent. efficient, at others it was as low as 50 per cent.

The Rettger filter tubes gave somewhat higher results, the lowest efficiency for a series being 93 per cent. and the highest 97 per cent. Individual results also varied considerably.

No such great individual variations occurred when using the modified sand filters. The lowest filtering efficiency obtained with this filter tube was 96 per cent. and the highest 99 per cent. for a series of tests. The numbers obtained in the second tube were always low, usually so low that there was often doubt as to whether the results did not represent unavoidable contamination during the plating process rather than inability of the sand in the first tube to retain the bacteria.

The results of the counts obtained by comparing the three filters side by side can be given very briefly. The first results obtained with either of the sand filters in comparison with the water filter were largely in favor of the sand filter. Later results, however, showed that just as high counts could be obtained with the Rettger aëroscope

*C. J. Koning. "Biologische und biochemische Studien über Milch." Milchwirtshaftliches Zentralblatt 2: 241–263, 313–338. 1906.

as with the sand filter, provided great care was taken before plating to wash out the inner surface of the long tube through which the air passes before entering the liquid. This was done in the later work, but not done in the earlier. Hence the difference in the results.

It seems fairly evident from the foregoing data, that good results may be obtained with either a sand filter or a water filter when sufficient care is exercised to prevent leakage and other sources of error.

The principal trouble with the Rettger aëroscope is due to the difficulty of sterilizing the apparatus without causing it to leak. The rubber stoppers lose their elasticity and become loose about the inner tubes when heated in the autoclave. Another difficulty is the tendency of the physiological salt solution to foam. This foaming may cause the liquid to become contaminated from the connections leading to the aspirator bottle.

The standard filter tube is also affected by steam sterilization. In fact its chief source of error is due to the necessity of sterilizing it by steam, which causes the sand to cake. Caked sand is not an efficient filtering agent because of cracks or lanes through which the bacteria can go as readily as through the air. Even when not caked sufficiently to be noticeable to the eye, the sand grains are apt to cling together when moist, making the spaces between them larger. This reduces the filtering effectiveness of the sand. Besides the effect on the sand, steam sterilization here again is apt to cause leakage about the rubber stoppers.

The modified sand filter presents none of these difficulties, since it may be sterilized by dry heat, and therefore is much more reliable. It is certainly much safer in the hands of a novice, as well as cheaper and easier to operate, than either of the other two filters.

II. Comparison of Results with Two Methods of Measuring Bacterial Precipitation.

As stated earlier in this paper, it was found to be necessary to know the number of bacteria settling upon a given area in a definite period of time. No standard method is recognized at present for attaining this end. It seems evident that there ought to be a recognized standard procedure. This determination is usually made by exposing a petri plate containing agar or gelatin for a given period of time and then counting the colonies which develop on the plate. It was felt, however, that this method could not give a true measure of the number of bacteria precipitated from the air, since it takes no account of the possibility of more than one bacterium being associated with a single dust particle. Ordinarily only one colony will develop when a bacteria-laden dust particle falls upon the surface of the medium in the plate. Some method should be used which will permit each individual bacterium to develop into a colony and thus to be counted. Such a method has been used by Koning* in 1906 and by the writer recently.

* Loc. cit.

Koning exposed dishes containing sterile milk for one hour to the stable air and determined the amount of precipitation by analyzing the milk. In the present work 500 ccm. of water was sterilized in a pail, which was covered with a metal lid until ready for use. After five minutes' exposure to stable air, the number of bacteria in the water was determined after thorough agitation.

Thirty-four comparisons between the results obtained by this method and the plate exposure method were made. The average of the results obtained by the plate exposure method was 8 colonies per square centimeter during a five-minute exposure. By the pail method, the average was 78 colonies for the same period of time. This is in the ratio of 1:10. This ratio did not hold, however, between individual cases—they varied all the way from ratios of 1:2 to 1:32. It is fairly evident, therefore, that the plate exposure method is inadequate for measuring bacterial precipitation. As a matter of fact it is more probably a fairly accurate measure of the number of bacteria-laden dust particles precipitating from the air. This criticism of the plate exposure method applies as well to other methods of enumerating bacteria in air that depend upon the principle of precipitation.

Conclusion.

From the foregoing data it seems evident (1) that the modification of the sand filter described herein is an improvement over both the standard sand filter and the water filter of Rettger, and (2) that the method of determining the amount of bacterial precipitation from the air as carried out in the present work gives more accurate results than the plate exposure method.

THE STATISTICAL TREATMENT OF STILL-BIRTHS.

Dr. Frederic V. Beitler,
Chief, Bureau of Vital Statistics, Maryland State Department of Health.

Read before the Vital Statistics Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

THE need for a proper definition of the term "still-born child" is evidenced by the discussion which has been given it both in the United States and Europe. Dr. Reginald Dudfield* in his excellent paper on this subject has gathered the definitions and methods of registration of still-births now in use throughout the world, and it is a noteworthy fact that, in all the data collected by Doctor Dudfield and his committee, there was no example of a legislative definition of the term "still-born child." Most of the definitions in use in the various countries were expressed in regulations which were drafted by registration officers.

We no sooner attempt to define this term than we are thrown into conflict with the definition of words, precedent and practice in different localities, and technical questions of law and medicine. We must bear in mind, when trying to formulate such a definition, that it must meet the purposes of practical registration. The very first requisite of a sound discussion is adequate consideration of the data which registrars of vital statistics are expected to collect. In general, the broader the definition the more valuable it will prove. It has been argued that a broad definition would involve certain difficulties in obtaining complete registration, but this is the argument of incompleteness, inseparable from every discussion, and I do not feel that this would be as great a consideration as the loss of statistical material under a restricted definition.

To define the term "still-born child" we would have to include:

(a) The definition of the word child.

(b) The age or period of gestation of products of conception which should be included under the term "still-born child."

(c) The signs or tests for the determination of life.

(a) Since the majority of all legislative enactments relating to the registration of vital statistics in the United States refer to a still-birth as a still-born child, it is necessary for us to make the clear meaning of the word child.

The true root of the word child is *kilth*, seen in Gothic, *kilthei*, womb, an origin which appears in the expressions "childbirth" or "to be with child." Literally, then, the root of this word indicates that it could be applied to products of conception at any period of gestation. Although it has, by precedent, been considered to include human offspring below the age of puberty, there is no legal authority limiting its application at the other

* Journal of the Royal Statistical Society, December, 1912.

end of the scale to fertilizations which have reached certain periods of gestation. Considerable confusion has been caused by the medical profession referring to an immature child as an embryo or a fœtus. These terms are used indiscriminately by physicians and in text-books, and this narrow technical practice will certainly give ground for restrictive legal argument unless forestalled by a proper definition of the term "still-born child."

I have brought to trial, recently, a physician, for neglecting to report a $4\frac{1}{2}$-months' still-born child, whose lawyer at the trial did not deny the fact that a certificate of birth and a certificate of death should be filed for each still-born child, but argued to the magistrate that a product of conception of $4\frac{1}{2}$ months' gestation was not a child but a fœtus. He brought as evidence four other physicians who testified that any product of conception was an embryo up to $3\frac{1}{2}$ months, a fœtus from $3\frac{1}{2}$ months to 7 months and a child from 7 months to date of birth. The magistrate, after our argument, was convinced that there was no reason for arbitrary divisions of the life of intrauterine products of conception, and held the view that if a 7 months' product of conception was a child, a $4\frac{1}{2}$ months' product, would also be a child.

It seems paradoxical for professional men, to whom the law looks for enlightenment, to try to make clear that a child of 3 to 4 months' utero-gestation is an embryo, from the 4th to 7th month a fœtus, and from the 7th to 9th month a child. A little greater sacrifice of sense would be involved in the statement that to the 3d or 4th month a mother conceives a pig, from the 4th to the 7th month a horse, and from the 7th to the 9th month a child. The word child, in the laws relating to vital statistics, should include all products of human conception.

(b) The age-period of products of conception which should be included under the term "still-born child" has never been established by legislative enactment. The definition of the word child would relieve us of such discussion, if we should leave out of consideration the value and practicability of the registration of all data relating to still-births. There can be no doubt that statistics of the causes of antenatal deaths are needed to aid in the prevention of 50 per cent. of the infantile mortality in the first two months of extrauterine life; and we cannot hope to reach accurate conclusions, if we arbitrarily establish an age-period, and neglect all still-births occurring prior to that period. From the knowledge which I have been able to obtain, it would appear that the most valuable statistical material will be that gathered from the reports of still-births between the second and third months of gestation, particularly that information which would throw light upon sterility, for it is in this period that the majority of still-births occur.

From its relation to the criminal law, the adoption of a stated "period of gestation" or "length of child"* would be very embarrassing, on ac-

* Suggested by the Special Committee appointed by the Council of the Royal Statistical Society. Vol LXXVI, Part 1.

count of the large field in which it would allow abortionists to practice. It is no easy matter to obtain evidence sufficient to warrant proceedings against an abortionist. If we require the registration of all products of conception, we should be able to institute proceedings for violations of the registration act. On the other hand, if we adopt a stated "period of gestation" or "length of child," almost any one who is accused could establish his innocence by the plea that the child was not of such age or such length as the statute specifies. It is common knowledge among physicians and midwives that most mothers can only give approximately the date of the last menstruation, and many women menstruate so irregularly that one must take a latitude of 2 to 4 weeks in calculating gestation periods. These uncertainties give a large and unfair advantage to violators. A definition which would not allow the state registrar to demand the registration of all still-born children cannot be considered fair to the best purposes of registration.

(c) The signs or tests for the determination of life should in all essentials be practicable. A child is considered born at the end of the second stage of labor after complete expulsion. This meets the legal interpretation of the term "to be born." It also meets the difficulty of breech and other irregular presentations, and permits the observation of the signs and tests for life at a time when the physician or midwife, in the performance of duty, will always take pains to note the facts.

The signs or tests for the determination of life are in the order of their accuracy as follows:

(1) Heart-beat.

(2) Attempts at respiration.

(3) Movements of the limbs.

The heart-beat, while the most accurate test of life, has the disadvantage of being at the same time impracticable, particularly in countries and states in which a large proportion of births are attended by untutored midwives. The only manner in which this test can be properly made is by auscultation with a stethoscope which would exclude the application of this test by persons not acquainted with its use. The other tests for heart-beat, such as pulsation of the cord or arteries, is *per se* not accurate since a very weak heart-beat does not convey a perceptible pulsation to the cord or arteries. Among midwives, at least, I do not consider the heart-beat a practical test for life, and I am sure that, if a child does not make attempts at respiration immediately after birth, the physician will devote all his time to induce respiration, and if he auscultates the heart at all it will be after a considerable time has elapsed; so long a time perhaps that the heart-beat, if it had been present, will have ceased.

In the state of Maryland there are 1,190 midwives, of whom there are licensed and registered 273 white and 408 colored. I am confident that not more than one per cent. are capable, at present, to auscultate the heart. Very few have adequate equipment to attend normal cases of labor, and to my knowledge, not a single one possesses a stethoscope. Of the total white

births reported during the year 1913 in the state of Maryland, exclusive of Baltimore City, 15.57 per cent. were attended by midwives. Of the total colored births reported during the same year, 58.91 per cent. were attended by midwives. Of the total births reported, 23.05 per cent. were reported by midwives.

Attempts at respiration have always been used by the majority of physicians and all midwives as the decisive fact in distinguishing live from still-born children. It is almost impossible to mistake other muscular movements for respiratory movements and they are equally evident to any or all persons in attendance at the birth of a child. From the standpoint of practicability, this sign of life, which needs no special training to observe, and to which the attention of the accoucheur is directed from the instant the child is born, would be the first choice among all signs or tests of the existence of life in new-born children. It is not as accurate a test as the heart-beat, discerned by skilled persons at the moment of birth; but on the other hand, only a limited number of the persons who are capable of doing so would auscultate the heart at this time, and a number equally as large would not be qualified to do so.

Movements of the limbs cannot be regarded as a good sign of life in any sense of the word, and is of so little importance as to warrant little discussion. However, attention should be called to the frequent apparent movements of still-born children caused by change of position of the mother, etc., which would certainly be interpreted by midwives as movements of the limbs. It would be safer to disregard all such movements in determining the presence of life.

Definition.

From the foregoing discussion we might propose to define the term "still-born child," as including any product of human gestation which can be recognized as such, which, after birth (complete delivery of the entire child, but not necessarily of the cord or after-birth) does not breathe.

The term "still-born child," as used in the model law, and practically all registration laws in the United States, admits such a broad definition. In order to obtain a legal opinion of the scope of the term as it is now used, I requested a definition from the Attorney-General of the state of Maryland* who replied as follows:

"I have yours of the 2d in which you ask me to advise you as to the proper meaning of still-born children as used in Section 9 of Chapter 696 of the Acts of 1912. The latter part of said section provides that wherever a child is still-born the medical certificate of the cause of death shall state in case of a premature birth, the period of uterine gestation in months, if known. From this it is very evident that the term still-born should be interpreted as representing every product of human gestation that could be distinguished as such and that the view, therefore, of your Department is correct." †

If our legislators have given the opportunity to obtain registration of

* Hon. Edgar Allan Poe.

† Definition applies also to term as used in model law

all still-births, it would be a great sacrifice, wherever the model law or one similar exists, to have to adopt, for the sake of uniformity, a "gestation period" or "length of child" criterion in a definition of the term "still-born child."

Relation of Antenatal Mortality to Postnatal Mortality.

It is impossible to obtain accurate figures from which to derive the ratios of living to still-born children, though there are several estimates which will give an approximate idea of the frequency of still-births. The most interesting estimate is that constructed by Karl Pearson in his essay on "The Chances of Death."

Pearson tried to fit to the mortality distribution in childhood a theoretical frequency curve, but found upon further study that to solve the problem two points must be borne in mind. First, that there is a mortality of childhood quite distinct from that of infancy; and secondly, the mortality of infancy must, at least in theory, be extended into the antenatal period to a distance which is approximately nine months. There can be little doubt about the approximate accuracy of this curve, since at points where the theoretical figures used in its construction can be compared with actual figures of mortality distribution they correspond very closely. For instance, the total prenatal mortality = 246, theoretically the curve gives 245.7. In the first year of life we have statistically 158.5 and theoretically 156.2 deaths, and in the second year of life statistically 51.2, and theoretically 53.5 deaths.

Pearson's estimates for antenatal deaths are given in terms of live-born children—*i. e.*, for every 1,000 live births, there are in the first 3 months of intrauterine life 391 deaths, in the second three months of intrauterine life, 131 deaths, and in the third 3 months, 83 deaths, totaling 605 still-births, or, more accurately, 605 deaths before the proper birthday. If, for convenience, these figures were subdivided into monthly periods we should have approximately, 1st month, 195.3; 2d month, 118.7; 3d month, 77.0; 4th month, 52.7; 5th month, 43.2; 6th month, 35.6; 7th month, 31.2; 8th month, 27.5; and 9th month, 23.8.* A progressive decrease in antenatal deaths from the 1st to the 9th month of the gestation period.

Another estimate of more recent date is that of Dr. Franklin P. Mall, Professor of Anatomy at Johns Hopkins Medical School, who for a number of years has been collecting embryological material for studies upon the development of the human embryo, and who has an excellent opportunity to make observations upon the frequency of still-births. Doctor Mall originally estimated that the frequency of still-births is one-third the number of live births, but the closer his observation the more confident he is that the incidence of still-births is at least one-half the total number of live births. That is, for every 1,000 live-born children there are at least 500 born dead.

If these estimates approach the

*Dr. John S. Fulton. The Necessity for Minute Study of the Age-Incidence of Causes of Infant Mortality.

truth, we can see without further discussion the need for more detailed knowledge which will enable us to ascertain the real causes of antenatal mortality, to obtain the exact numbers of deaths from these causes, and to classify them in a manner similar to postnatal causes of death.

We must also bear in mind the relation which the causes of prenatal death bear to the high death-rate in the first month of postnatal life. We have seen by the figures of Karl Pearson that at the 9th month of pregnancy we can expect a death-rate of 23.23 per thousand of all gestations. The fact that a child is born alive does not by any means indicate that it has been relieved of antenatal influences. Experience teaches us that frequently the child survives its antenatal period with great difficulty, and is brought into life so handicapped, in many instances, as to succumb after a few hours or days of extrauterine existence.

It is interesting to study, from the meager data which I have, the relation of antenatal causes of death upon the mortality figures in the 1st month of extrauterine life. Projecting the figures of Karl Pearson into the 1st month of postnatal life, we should have about 20 deaths per thousand children born, due to prenatal causes.

Using the mortality figures of the Registrar-General of England and Wales, we find grouped, under items 150, 151 and 152 of the International Classification, chiefly those deaths (congenital debility, congenital malformation, etc.) which the attending physicians had to attribute, in great measure, to prenatal influences. The death-rate per thousand of live births from these causes was 29.87, constituting 50 per cent. of the total mortality in the first month of life. There is a difference of 9.7 between the estimate from Pearson's figures and that from the report of the Registrar-General, but the difference would be smaller if we could make proper adjustment for errors in classification and diagnosis.

While there are no accurate figures in the United States giving the deaths in the first few months of life in terms of live births, we may give some interesting figures from the Mortality Bulletin of the Census Bureau* for the year 1910. During this year there were in the registration area of the United States 154,373 deaths under one year, constituting 19.19 per cent. of total mortality. Of this number of deaths there occurred as follows:

Total deaths.	Deaths classified under 150, 151 and 152.	Per cent. of total deaths in age-periods.
Deaths under 1 day, 14,946.	12,252	81.98
Deaths, 1 day, ... 7,505	5,865	76.81
Deaths, 2 days, ... 4,453	2,966	66.60
Deaths, 3 days. 3,359	2,076	61.80
Deaths under 1 month, ... 58,089	35,672	61.40

These figures give an idea of the proportion of deaths in early life, which are dependent, in a majority of instances, on antenatal causes. It is not necessary to complete this table since the figures already given are

* Mortality Bulletin, 1910.

ample, and it would be impossible to separate the mortality figures of early childhood, which become more manifest each succeeding month. I do not think, however, there is much doubt that antenatal influences are clearly traceable in the mortality rates in the age periods of 0–1 year and 1–2 years.

It is my opinion that too little attention has been given this subject. Looking at it merely from the standpoint of registration we have been too insistent upon an easy method of registration, and have greatly underestimated the value of a record of still-births and their causes. As a matter of fact, the problem presents a number of interesting phases, first, its ever increasing relation to the birth-rate; second, its great reflection in the death-rate of the first and second years of life; and third, the alliance of the causes of still-births with those of sterility.

The time has come when the American Public Health Association must adopt some definition of the term "still-born child." The way is open for the adoption of a broad definition which will serve the best purposes of registration, particularly, that leading to knowledge which tends to add to the health and happiness of the state.

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INDUSTRIAL HYGIENE.

At this year's session of the California legislature the workmen's compensation law was amended so as to include occupational diseases as well as accidents. Victims of such maladies are already compensated under the Massachusetts law and it is probable that within a few years the great stretches of the continent between these two leading states will be covered by legislation providing occupational disease indemnity. The Kern-McGillicuddy bill in the United States Congress, designed to extend this relief to the 400,000 employees of the federal government, has been favorably reported. And all of this is in line with practical experience under the earlier laws of England.

But progress here in occupational disease legislation presents many problems. Which of several recent employers, for example, is to be held responsible for a serious case of painter's colic? How is the trade unionist's prejudice against

physical examination to be met? How shall the "physician problem" be handled where the occupational cause of the personal injury must almost universally be determined by expert opinion? How many public health officials are well informed concerning the relation of occupation to disease in their own communities?

That the occupational disease problem is not an unimportant one we may judge from the fact that considering the industrial poisons alone we find already prepared a comparative list of fifty-four, one of which, lead, is in daily use in more than one hundred and fifty trades. Connected with dusty trades of all sorts are found both poisonous and non-poisonous materials which by infiltration and mechanical irritation produce, for example, various lung diseases. The tunnel and caisson worker faces compressed air illness; the hatter dreads the "shakes"; tanners and workers on hair goods are in danger of the anthrax bacillus. Less easy to trace but more wide-spread, are the obscure ailments which may arise in any industry, from insufficient or excessive lighting, from extremes of heat, cold and humidity, or from work too heavy, too persistent and too intense without adequate periods of rest.

Fortunately, in recent years in America, there has been a growing interest in the subject of industrial hygiene. Investigations have been made, conferences held, reports published, legislation prepared. And one of the most significant new developments of this year will be the first meeting of the Industrial Hygiene section of the American Public Health Association, at Rochester in September. The proceedings of that meeting will be watched with special interest as indicating whether the members of the Association appreciate the importance of the problem and whether they fully realize their duties in this matter.

MASSACHUSETTS CONFERENCE OF HEALTH OFFICIALS.

A convention of health officials, and others interested in public health, was held at Ford Hall, Boston, Thursday, April 29, under the auspices of the Commissioner and Council of the State Department of Health and the Massachusetts Association of Boards of Health, in connection with the quarterly meeting of the Association.

Dr. Allan J. McLaughlin, Commissioner of Health, presided at the morning session.

The following cities and towns were recorded as represented at the conference: Arlington, Barnstable, Belmont, Beverly, Boston, Braintree, Brockton, Brookline, Cambridge, Canton, Chelsea, Chicopee, Clinton, Cohasset, Concord, Duxbury, East Bridgewater, Everett, Fall River, Fitchburg, Framingham, Gardner, Gloucester, Haverhill, Holyoke, Hopedale, Lawrence, Lee, Leominster, Lowell, Lynn, Malden, Mansfield, Marblehead, Medway, Medford, Melrose, Needham, New Bedford, Newburyport, Newton, North Adams, North Attleboro, Norwood, Orange, Quincy, Revere, Rockland, Rutland, Salem, Salisbury, Shrewsbury, Somerville, Springfield, Swampscott, Taunton, Walpole, Waltham, Warren, Watertown, Webster, Wellesley, West Boylston, Westboro, Weston, Winchendon, Winchester, Winthrop, Woburn, Worcester, Yarmouth.

The chairman then introduced His Excellency, Governor David I. Walsh, who delivered the address of welcome.

ADDRESS OF WELCOME.

Hon. David I. Walsh,
Governor of Massachusetts.

Because the public health is the foundation upon which rests the happiness of the people and the welfare of the state, I feel that the Commonwealth is to be congratulated this morning upon the gathering together of so many active workers in the field of health conservation.

If there has been any one governmental problem in which I have been more vitally interested than any other it is that of preserving the public health. My interest in this problem has been actuated largely by a realization of the importance of having the government assist in reducing to a minimum the misery, distress, suffering and waste caused by disease and death. I have been ambitious—intensely so—that my service to the Commonwealth of Massachusetts might be remembered, long after I am removed from it, for the progress and advancement of our health organization and for the encouragement of the efforts of those unselfishly devoted to the public health.

I deem it a special pleasure, therefore, to have a part in welcoming the public health officials of the various municipalities and also the many public-spirited citizens who are devoted to this cause and have long appreciated its importance. We are making history here today. No gathering like this has ever before taken place in Massachusetts, and its possibilities cannot be estimated or measured.

Sanitary science has, to a great extent, within our lifetime overcome the former ignorance of the causes of

disease and of the most effective means for their prevention. We in Massachusetts are entitled to congratulate ourselves upon our share in applying to the common advantage the great discoveries of modern sanitary science. We do not, however, forget that much remains to be done and that we should be false to ourselves and to coming generations if we did not ever press on toward new achievements in the conquest of disease.

To illustrate the field which is still before us to be explored and the progress which you may still hope by faithful efforts to attain, permit me to call to your attention a few facts gathered from the death records of Massachusetts in the year 1913. A fact which stands out in startling prominence is that of the 53,286 deaths which occurred in that year no less than 13,661 were of children under five years of age. While we do not forget that infant mortality has been greatly reduced by the progress of sanitary science in recent years, is it not evident that this proportion is even yet frightfully high, and that we should bend every effort for a still greater reduction of this terrible infant mortality? Education of mothers in matters pertaining to infant hygiene is evidently the one need of the hour, which is of more importance from the health standpoint than any other. I trust that the enthusiasm generated in this meeting may reach out into the entire Commonwealth and may be reflected in the health and happiness of many a household.

I am especially glad of the opportunity which this gathering affords of bringing the workers for public health throughout the Commonwealth into closer contact with our State Health Department, of which, in its present condition, the Commonwealth of Massachusetts may well be proud. To be in the highest degree successful the ablest department of health must have the earnest coöperation and good will of the local officers and boards of health. I commend to you most heartily Doctor McLaughlin, the Commissioner, his eminent Public Health Council, and all their co-workers and subordinates. This is a field of work in which party lines have no place, political distinctions may be forgotten, and all may work heartily together for a common end, the good of humanity.

As we survey the field we must note that while some diseases, such as diphtheria and typhoid fever, have decreased to a marked extent in recent years, and the deaths from tuberculosis even are less numerous than they were ten years ago, there is still much room for improvement even in these respects, while there are other diseases whose destructiveness appears to be upon the increase. This is the case notably with pneumonia, the number of deaths from which has been growing annually for several years. The same is true of the so-called wear-and-tear diseases of middle life, diseases of the heart and blood vessels, and of the kidneys and the brain, and also of the scourge of cancer. The mortality from these ills is evidently excessive, and the problem of reducing it is at present even more pressing than that presented by the communicable diseases.

The New York Health Commissioner in his last annual report has declared his conviction that it is possible by proper sanitary precautions to add at least five years to the lifetime of each individual who has reached the age of forty-five. His opinion must make a profound impression upon us all when we think what it would mean to the Commonwealth were five years of service added to the lives of the distinguished and useful fellow citizens, whose premature death from some of these diseases we have so often occasion to lament. I will not trench, however, upon the province of the eminent specialists who will address you upon the specific measures which are to be taken into consideration in combating the ever-present and insidious enemies of the public health; I wish only to impress upon you that upon your individual activities in your own local spheres of influence, upon your zeal and faithfulness in imparting to your neighbors the saving knowledge which has been gathered by the scientists of today, is dependent very largely the sanitary education of the entire citizenship and the general prolongation of life and happiness which is our common aim. You must bend your best efforts to the enlightenment of the people in these vital matters. The Commonwealth relies upon you for this service, and I believe that this reliance is well placed and will be justified by your increased devotion and enthusiasm during the coming year, as a result of this important gathering, which I consider one of the most significant events of the present year.

Papers were then read in the following order:

THE MAIN POINTS OF ATTACK IN THE CAMPAIGN FOR PUBLIC HEALTH.

Dr. Charles W. Eliot,
President Emeritus of Harvard University.

THE progress in knowledge of preventive medicine made during the past fifty years, and in applications of that knowledge in social practice, has been the most cheerful phenomenon in the recent history of civilization. The new applications of physical forces—heat, light, and electricity, which mankind has learned to use in its conflict with nature—have proved to be highly beneficent in the field of preventive medicine. Civilized communities have been enabled to make their water supplies, food supplies, and drainage systems safe, and to contend with unexampled success against formidable pestilences, the common communicable diseases, and the bodily ills which attend urban life and the factory system. In Massachusetts the organization of the public health service has, within ten years, been made for the first time thoroughly efficient; and the State Department of Health has lately been much strengthened through pub-

lic appreciation of its beneficent work, and the coöperative good will of the legislature and the executive.

Great as recent progress has been in Massachusetts in this invaluable branch of the public service, it is obvious that much more remains to be done; and I hope on this fortunate occasion to be able to set before this professional audience certain lines of work in which there is urgent need of more strenuous medical activity, of more expenditure on the part of the public, and of more well-informed zeal on the part of all persons interested in the welfare of the community.

The first subject to which I venture to direct your attention is the public treatment of tuberculosis. All boards of health—we just listened to a long list of Massachusetts boards of health apparently in abeyance—all boards of health should concern themselves actively with making ample provision all over the state for the treatment of incipient cases of tuberculosis, especially among the young, under the most favorable possible conditions, for the segregation of advanced cases, and for the diffusion among the entire population of knowledge of the means of preventing the spread of the disease through contagion. The contagiousness of tuberculosis has been widely taught for a generation past; but that knowledge has not penetrated to every class of the population; so that foci of infection are constantly established and maintained without the knowledge of the health authorities, and without adequate public control. On the other hand, there is danger that some tuberculous patients may suffer from lack of care; because the persons around them, acquainted with the contagiousness of the disease, but not knowing how to make themselves safe, neglect or avoid the sufferers. It should be the duty of medical practitioners not only to report the deaths from tuberculosis, but to report their current cases, together with a statement that each case is, or is not, properly cared for. The law on this subject is sufficient; but public opinion does not yet compel its systematic enforcement. The number of sanitaria and hospitals devoted to tuberculosis is already considerable, but is far too small; and the local boards of health and the city and town governments are not all awake to their responsibilities and duties on this subject.

The next evil which should be attacked with the utmost vigor by all boards of health is alcoholism. Public opinion needs to be enlightened on two points with regard to the use of alcohol as a beverage. In the first place, it should be brought home to the entire population that the habitual use of alcoholic beverages reduces, in a serious degree, the productive efficiency of the community. The recent public proceedings in Russia, France, and England against the use of alcohol, in order to enhance the efficiency of their population in time of war, have directed public attention to this subject with unusual force. It clearly appears that the great masses of grains and other materials used in the preparation of alcoholic drinks

are much worse than wasted, so far as national efficiency is concerned. Millions of tons of grains, hops, and grapes are every year withdrawn from use as human food, and converted into drinks which are not only not nourishing, but distinctly injurious to the human body under all circumstances, unless largely diluted. The entire annual bill of the white race for alcoholic drinks is worse than wasted expenditure; and that bill is huge in every European and American nation. In the second place, recent experiments on the effects of alcohol on the nerves and glands of the human body have demonstrated beyond a doubt that alcohol invariably does harm, and never any good either in health or disease. The use of alcohol as a defense against exposure or fatigue has been given up by all sensible persons. It diminishes the proper control of the nervous system over the rest of the body, and enfeebles that exercise of the will which we call self-control. The habitual use of alcohol is the prolific source of a great variety of diseases and disabilities in the human body, causes many frightful disasters in human reproduction, and contributes to produce in innumerable instances family poverty and distress. Degradation through the use of alcohol is the greatest evil the white race is suffering from; and the evil has not diminished during the last three centuries because of the facile production on an immense scale of cheap spirits distilled from grains and potatoes.

This evil is rooted, first, in what are called vested interests,—that is, in the investment of large amounts of capital in the plants which produce, store, and distribute beers, wines, and spirits, and, secondly, in the methods of taxation to which the white nations are accustomed. Heretofore the medical profession and the public health officers have given an uncertain sound concerning the use of alcohol. Many physicians themselves use alcohol habitually or in emergencies, and not infrequently advise its use in both sickness and health and in advanced age. Boards of health have not considered it their function to interfere with, or protest against, its use; and most public authorities have declined to interfere effectively with the distribution and consumption of alcoholic beverages. The efforts of legislatures and courts to prevent even the most obvious abuses of alcoholic drinks have, as a rule, been well-nigh futile. Indeed, the habitual action of police authorities and courts in dealing with habitual drunkards cannot be surpassed in stupidity and inefficiency. Arrest is followed by a period of confinement too brief for cure or reformation; a few weeks of abused liberty follow discharge, and then the hopeless round begins again.

It remains for the boards of health to attack this hideous evil with the weapons and in the spirit of preventive medicine. They should bring to the work all recent knowledge concerning the effects of alcohol on the human body, call to their aid legislators who can find equivalents for the public revenue now derived from the manufacture and sale of alcoholic drinks, and reënforce to the utmost the wise counsellors who by moral teachings have brought about during the past

fifty years considerable improvements in regard to the use of alcohol in the more intelligent and conscientious classes.

The next subject to which boards of health should direct their activities is the cure and limitation of venereal diseases. These diseases are the worst which afflict the human race in their effects on the individual sufferer, on the community of today, and on its posterity. They are, in the first instance, the result of lust in men; but they can be communicated to innocent persons and to generations yet unborn. There are no trustworthy statistics concerning the prevalence of these diseases among persons who are apparently in health, such statistics as exist being generally founded on observation of persons not in health, such as hospital patients and the men and women who resort to outpatient departments and dispensaries, because they are in some way suffering. The dreadful military and naval statistics are trustworthy; but they relate to a class of men who live under unnatural and unfavorable conditions. It is certain, however, that the venereal diseases prevail in the community as a whole—sick and well—to a formidable degree, and that they frequently complicate other disorders. Recent discoveries have furnished valuable tests for the presence or absence of these diseases in the human body, and have also supplied the medical profession with means of probable cure, prompter and more effective than any previous generation of physicians has possessed. Moreover, various other diseases or disabilities to which the human body is liable, such as general paresis, locomotor ataxia, insanity, and blindness, have been traced to one or other of the venereal diseases, not as an exclusive cause, but as a common cause.

Under these new circumstances, the former neglect of these diseases and the former silence about them have become no longer justifiable. It is quite as much an object for the health authorities of a modern state to search out, register, and treat the cases of venereal disease, as to detect and treat, if need be at public expense, cases of scarlet fever, diphtheria, typhoid fever, or smallpox. The interest of the community in the segregation and treatment of venereal diseases is quite as strong as its interest in the effective treatment of any other of the communicable diseases; indeed, it is even stronger, because of the persistence and destructiveness of the venereal diseases and of their transmissibility to other generations.

An inevitable part of this subject is society's treatment of prostitution. Recent inquiries have demonstrated that more than half of the prostitutes in a modern city, or a rural community, are likely to be feeble-minded women. The effective confinement of feeble-minded women, at least till they are past child-bearing, is, therefore, an indispensable part of the restriction of prostitution and the limitation of venereal disease. Here is an important field of labor for all boards of health and particularly for every state board of health. The public mind and conscience need much enlightening and arousing on this sub-

ject. In order to obtain the best results, the coöperation of the family, the physician, the church, and the board of health is necessary. Within the past four years much valuable experience has been acquired concerning the police suppression of prostitution. It has been proved that an honest police force, under the direction of a right-minded commissioner or chief, can suppress public or semi-public brothels, and make it difficult for a casual inquirer to find a prostitute. It has been proved, moreover, that this suppression diminishes the accessibility and the amount of sexual vice, and therefore the profits of commercialized vice, much as alcoholism is diminished by the absence of saloons. Of course, under such circumstances this vice is more or less scattered, and driven to new resorts and devices; but there are also new methods by which the new shelters or channels for vice can be successfully attacked one after another as they develop, with such coöperation as large employing corporations, owners of hotels and apartment houses, the post-office and the telephone companies, and the numerous people who are interested in the protection of the neighborhoods in which they live can readily supply. In view of the facts brought out by commissions of inquiry and the police forces of large cities within the past four years, it is impossible longer to maintain that the suppression of public vice resorts does more harm than good. As to the toleration of licensed, faintly regulated quarters for vice, it has been abundantly proved in Europe, Asia, and America that there has never been either effective segregation or effective regulation; and that this ancient policy has no value whatever.

It is for the boards of health, in coöperation with the medical profession and the courts, to apply to these scourges the principles of preventive medicine. It is also highly desirable that philanthropic and religious efforts should take a new direction, and that such bodies should use all their forces to prevent boys and girls, or young men and young women, from falling into sin and wretchedness through ignorance. The right giving of the needed information to young people requires knowledge of the subject in parents, teachers, and the leaders of young people in churches, clubs, Christian Associations, and social gatherings. It is a work requiring delicacy and reserve, and good judgment concerning time, place and company; but it is indispensible work in which the medical profession and the boards of health ought to take active and serious part.

These two extreme evils—alcoholism and prostitution—are almost always found in close association. In defense of the community, boards of health, licensing boards, and the police need to deal with them, as a rule in their natural conjunction. To disassociate them is to enfeeble both. The assistance of responsible real-property owners is highly desirable, and is often to be had. This conjunction of liquor-selling with vice, however, presents to city and town authorities one of the most difficult of their problems. Whatever success

is gained in dealing with the evil of alcoholism—and some success has already been gained and more is in sight—will bear fruit at once in the diminution of sexual vice.

It is clear that total abstinence from alcoholic drinks is far the safest course for adolescents and young people; because alcohol, even in small quantities occasionally, is liable to diminish self-control under sudden temptation. The responsibility of physicians and boards of health in regard to the advice they give to young people on these matters is heavy indeed; and so is their responsibility on these subjects towards legislatures, municipal governments, courts, and state executives. The health authorities and the medical profession should join hands to procure adequate provision in general hospitals and dispensaries for the effective treatment of drunkenness and the venereal diseases, and should see to it that none but practitioners fully acquainted with the somewhat elaborate technique of the new treatment for those diseases should be allowed to administer that treatment.

The only other subject I can deal with within the proper limits of this paper is the function of boards of health as teaching forces, a function to be exercised through public health officers, physicians and surgeons, trained nurses, dental nurses or hygienists, private societies, printed reports, posters, and circulars, and the public press. The ignorance of the American people concerning individual, family, and public hygiene is vast; and its consequences are deeply to be deplored. Until lately, boards of health gave their attention chiefly to fighting vivid evils which were obviously damaging the public health, just as the ordinary physician devoted himself to curing patients that were already sick. They labored to protect the community from foul waters, infected or spoilt foods, adulterated drugs, the spread of contagious diseases, and the effects of unwholesome trades. They have lately, like the physician, taken on some preventive functions; and the best of these functions is the giving of instruction and guidance to legislators, public officials, and the thoughtful portion of the population. Through the efforts of private societies and public bodies much instruction has been organized and is under way, as for example in the work of physicians and nurses as inspectors in schools and colleges, of the district nurses, of the new dental nurses or hygienists in schools and orphanages, of the social workers who follow to their homes persons treated at hospitals, out-patient departments, and dispensaries, and of the volunteer physicians and paid nurses who teach mothers how to keep their babies well. Nurses or hygienists are doing the greater part of this eminently concrete and practical teaching; and good results already appear in the mortality statistics, and in the remarkable reductions in the number of cases of children's diseases effected in institutions for children which have been under observation during the last six or eight years. The success of work of these various kinds, already

undertaken and in progress, is so considerable that a great extension of the work is emphatically called for. No public expenditure can be as rewarding as well-directed expenditure on the public health; because that is the expenditure which results most directly in the increase of both public efficiency and public happiness.

There is one kind of instruction, much needed by the American people, which would illustrate better than any other the desirable preventive functions of health officers and boards of health, namely, instruction concerning diet. The ignorance of the American people concerning the enjoyable, healthful, and productive use of foods is profound; and this ignorance results in immense waste, reduced industrial efficiency, unnecessary ill-health, and shortened life. The ordinary American diet errs gravely in regard to both quantity and quality,—particularly in the amount of proteid habitually ingested. In the future the activities of boards of health and health officers should be directed constantly to the giving of universal instruction in the normal feeding of both children and adults, and in the nutrition values of the various materials which the markets supply, while not neglecting the protection of the community from unsafe articles of food. Again, a larger proportion of the American people than of any other people needs to be warned by health experts against the destructive effects of luxury and self-indulgence; because a larger proportion has the means of living soft, lazy, and unproductive lives. It is interesting to see how much public instruction about diet is now being given by European governments, in order to maintain the efficiency of the peoples under the stress of war. Americans need that sort of instruction all the time—in fat years and lean years, in good times and bad—and there is nobody to give it with authority except the medical profession and the public health officials.

Massachusetts set an excellent example concerning the teaching functions of boards of health when the legislature in 1893 appointed a joint board on the improvement of Charles River, consisting of the recently created Metropolitan Park Commission and the State Board of Health. That Act, with its invaluable results, emphasizes the obvious fact that boards of health should be vigorous teachers of sound principles concerning housing, open spaces in cities, parks, garden cities, and air and light in all dwellings, shops, and factories. These are all public health problems, and fields for the demonstration of the power of preventive medicine in promoting the public welfare.

"SCOPE OF THE NURSE IN PUBLIC HEALTH WORK."

Miss Ella Phillips Crandall,

Executive Secretary, the National Organization for Public Health Nursing, New York City.

I ASSURE you I am deeply sensible of the compliment and the significance of inviting a representative of the nursing profession to speak on this occasion.

There is no more splendid record than that of the development of institutional care of the sick in America during the past quarter of a century. The American public has responded liberally to this obligation, but, in comparison with its appreciation of the importance of providing institutional care, it has been surprisingly tardy in recognizing an equal obligation to care for those who, for one reason or another, cannot or will not go to institutions and must, therefore, be given care in their homes. Dr. William Osler was the first to tell us that only 10 per cent. of the sick population of the world is cared for in any sort of an institution. Therefore, America and other countries should provide other than institutional care for 90 per cent. of those who are sick and injured. Of that number a very small percentage represents the class of society who can afford to pay $25 or $30 a week for a graduate nurse's resident service. The remainder must be cared for either by undergraduate or untrained women, or by graduate visiting nurses. If these facts had been brought earlier to the attention of American citizens, it is probable that the history of public health nursing would have been different than it has been.

Up to 1901 there were only fifty-three associations and one hundred and thirty-six nurses doing any sort of visiting or home care of the sick in the United States. About that time what is now well known as the public health campaign began to take definite shape, and among the many activities which it inaugurated the work of the visiting nurse has been conspicuous. There are now 2,066 associations and well over 5,000 nurses doing one form or another of what was originally called district or visiting nursing; and its scope and variety have developed quite as rapidly as has its numerical increase.

The anti-tuberculosis campaign was the first to call for the coöperation of visiting nurses. New laws had been written, new ordinances passed, new appropriations made, new departments and laboratories established; hospitals, sanatoria and open-air schools built and equipped; clinics, classes and lecture courses organized.

Still one factor was lacking to complete the program for the study and prevention and cure of tuberculosis. This was clearly evident when the first reports were submitted, and those who were in charge of the work determined that what was needed was an interpreter, a follow-up agent, because no amount of scientific knowledge, in scientific terms, will very greatly in-

crease the popular intelligence, and no amount of administrative control will be entirely effective until the people themselves, for whom the laws are made, understand that they are protective rather than restrictive, and, therefore, cordially and voluntarily coöperate in the observance of them. Thereupon they looked about to see who might be the most logical interpreter and follow-up agent, and they said: "The visiting nurses are already going in and out of many homes. Their entrée is assured. They are welcomed because they render a tangible service which is quickly interpreted into terms of friendliness and good will, and, therefore, they get the confidence of the people. We will call on them to carry this health message." And so it was that a very greatly increased demand was made for the visiting nurse, who was soon regarded as an indispensable factor in the combat against tuberculosis. Working with her hands as she does, she is recognized by the people as a fellow-workwoman, and they understand her and are willing to do what they see her do, when many times they would not be willing to do what she told them or even asked them to do.

In the same manner, the nurse has been found to be an almost if not quite indispensable factor in the school hygiene movement. Medical inspection was established first, and pretty thoroughly tried out. The following figures from New York City are quite indicative of the records at large, whether in small communities or large ones, and they will show rather conclusively the value of the nurse in the school hygiene movement. Before the nurses were introduced into the New York City schools only 6 per cent. of the physicians' written orders sent home by the children were carried out, and after the introduction of the nurse 84 per cent. of those orders received attention, because the nurse took the orders and the children home and explained to the parents, showed the mother how to do the treatment, and if, for one reason or another, usually because the mother herself was a wage earner, she could not take the child to the doctor or to the dispensary or the clinic, as instructed, the nurse herself made provision for the child to be taken, often going herself. Moreover, because it was possible for her to follow up and treat the children suffering with minor skin and eye conditions, instead of 57,000 exclusions in one year, as had been previously recorded, only 4,000 children were excluded for the same causes after the introduction of the nurses. In fact, medical inspectors themselves have been first to say that their work is almost futile without the follow-up work of the nurses, and some go so far as to say that it is a farce.

In many smaller towns which cannot afford both a medical inspector and nurse, the community has seen fit to employ a nurse and ask voluntary service of its doctors. The physicians have assumed this public duty, but have frequently insisted that the nurses undertake the responsibility of detecting minor ills and treat them according to standing orders which they prescribe. This has led, not only in the smaller communities but in larger ones,

to considerable extension of responsibility on the part of school nurses, which they themselves have been very slow and even unwilling to accept. However, men like Dr. George Goler of Rochester and others claim that the nurse can easily be trained, and should be trained, to do this routine inspection, and thereby liberate the medical inspectors for more thorough and more frequent medical examinations of the children. Hence the nurse has been proven to be an important factor in rounding out the program of school hygiene. .

The same may be said in the campaign against infant mortality. Milk stations alone were ineffective; in fact, they were little more than a bait to bring the mothers to the conferences and clinics for instruction. Even conferences and clinics, in and of themselves, were insufficient, and a follow-up agent in the homes was found to be necessary. When the physician in the clinic prescribes an individual formula for the baby of poor parents, as does the pædiatrician for an infant in the well-to-do home, and the nurse goes to the home and with such instruments as the mother can afford, and with such measure of cleanliness as she can establish, teaches her by actual demonstration how to modify the milk for her infant, she not only helps the mother to take better care of the present infant, but she makes her a better caretaker of future infants. Incidentally, she has the opportunity to teach the entire regimen and care of the infant, and, also, home and personal hygiene for the whole family. It is obvious, therefore, that the home visits greatly increase the nurses' opportunities for service and for education beyond those afforded by the infant welfare stations.

Medical social service presents a similar claim upon nurses. In these days of preventive medicine, staff physicians in hospitals and dispensaries are demanding to know the social, economic and industrial causes of the physical conditions they are asked to treat. Frequently they insist upon having this knowledge before they pronounce their diagnosis or inaugurate treatment, and oftentimes the treatment itself is largely social. The physicians are quite too busy with their own important work to search out this social diagnosis or to perform the social treatment, and the socially educated nurse becomes the most logical assistant and co-worker of the practitioner of preventive medicine.

Social service is equally important to the hospitals, where the ever increasing financial burden, due to the development of medical and surgical science, makes it just as encumbent upon them to do finished work, thereby preventing the patients from being repeaters, as it is to avoid the necessity for school children to repeat their grades. Once more, therefore, in response to the demands both of physicians and institutions, the follow-up agent in medical social service has found an essential place.

In another important field the visiting nurse has found a place. Shops and factories, mines and mills, department stores and hotels, insurance companies and other employers of labor

have found that it is a paying proposition to keep their employees in good physicial condition. All manner of industrial welfare activities have been developed, and none have been more prompt in their returns or more appreciated by the recipients than that of visiting nurse service. Indeed, many of the companies have discovered that it pays to take care not only of their employees but of employees' families.

Furthermore, statisticians have pointed out that nurses are the most logical gatherers of vital and morbidity statistics. In this country, where such statistics are so meagre, nurses have come to realize for the first time that they have an opportunity to render a great collective service in behalf of national public health by gathering intelligently and recording accurately these fundamentally important facts and submitting them to statisticians whose duty it is to interpret them.

So from institutions and the medical profession, from sanitarians and statisticians, from teachers and social workers has come the demand for the services of graduate nurses who are not only technically trained, but especially trained for this larger field of public health service. She who was formerly the visiting nurse has become the public health nurse, because formerly her service began and ended in the care of the sick individual while now it becomes but a means to the larger end of health education and protection. Moreover, her service in every home relates itself not to the individual alone but to the family of which he is a part, and she is brought to see that each family is a part of the community; and the sickness in a home, the lower efficiency that results, and the poverty which frequently follows, all become a community problem and, therefore, her task takes on a public rather than a private aspect. Dr. Edward T. Devine tells us that 75 per cent. of the cases of poverty that pass through the Charity Organization Society of New York find their origin in illness. This statement alone emphasizes the fact that the visiting nurse's function is that of a community welfare agent.

In direct response to these successive demands of the public upon visiting nurses which I have suggested, their work has become distinctly specialized and many thoughtful people now consider it over-specialized. It was inevitable that it should have followed such a course up to the present time because private and public funds were appropriated for particular causes and could not be diverted. The result is, however, that there is duplication of effort, over-lapping of districts, and consequent waste of funds. More than that, there is confusion in the minds of the recipients of all this service, and the nurses are now frequently known as "the-nurse-of-the-lungs," "the-nurse-of-the-milk," and "the-nurse-of-the-legs." When four nurses are found in one home in one morning, no one wonders that the weary and impatient mother says, with significant inflection: "Another nurse!" If we were asked to endure four nurses in our homes in one morning, we should be apt to make a public as well as private protest. Therefore, it behooves us to find a way to avoid such a measure of specialization. There is no

comparison between specializing in medicine and in nursing because the education required for the practice of medicine is much more profound, and many now believe that a nurse, thoroughly well trained technically, can, in one academic year (eight months), be sufficiently qualified for the general practice of public health nursing.

The smaller towns and communities are already demonstrating this fact. While the large cities, with their specialized staffs, have done the pioneer work, have established the standards, and have led the way, the small communities, who could afford but one nurse, have called and asked her to be a tuberculosis nurse, an infant nurse, a school nurse and a general visiting nurse all in one, and she has done it with astonishing success and effectiveness, and to the great satisfaction of the communities themselves. Indeed, she is the one who represents most fully what is meant now-a-days by a public health nurse, and it is interesting to see that the term "community nurse" is growing in favor. Moreover, she is not only doing her regular nursing service but, according to the demands of the town in which she serves, she is acting as deputy health officer, sanitary inspector, attendance officer, assistant medical inspector, visiting dietitian, teacher of hygiene, member of the board of health, member of the board of public welfare, social service agent, inspector of midwives, and boarding out places for children, supervisor of fumigation and gatherer of vital statistics. These added duties are severally placed upon her by health officers and physicians and social workers. Indeed, it is sometimes difficult for her to determine whether her primary task of nursing or the interesting opportunities for extended service are the more essential.

Florence Nightingale said years ago: "District nursing is desirable if from a merely economic point of view. It often prevents whole families sinking into poverty and vice, the consequences of which take vengeance on society."

There are hundreds of cities and towns in the United States which are supporting public health nurses in whole or in part.

Within more recent dates, many counties have appropriated funds for similar purposes, thereby putting an end to the sad contradiction of carrying the nurses' beneficent service to the town line and refusing it to the family just beyond and to his country neighbors. Moreover, there are now four states, including Massachusetts, which have undertaken serious health programs in all of which the public health nurse has been given a conspicuous and honorable part.

This rapid growth of public health nursing, together with the ever-increasing demand for legislation in behalf of health protection in general, makes it reasonable to believe that in the not distant future the public health nurse will be considered as indispensable a community servant as is the public school teacher.

CONSERVATION OF LIFE AT MIDDLE AGE.

PROF. IRVING FISHER,
Yale University.

IT REALLY is a great pleasure to meet the active health workers in the state of Massachusetts. All of us who have followed in this health movement look to Massachusetts as the leader. Massachusetts has been the pioneer in the past; it was the pioneer in establishing a state board of health, and, I believe, if for no other reason because of what I have heard this morning, that it is going to be the pioneer again.

What I had to say is thoroughly in line with what you have already heard. I can merely add "amen" to all that has been said, and point out by a few facts, figures and inferences, the lesson of it as I see it.

The preservation of human life is important from every point of view, because human life is the most precious possession that human beings have; but the preservation of human life at middle age is doubly important, because middle age is the center and core of this precious human life. It is the part for which the early years are the preparation, and it is the part on which the later years look back, or should, with satisfaction.

It seems to me that the most eloquent testimony to the importance of what Doctor Eliot has said is the fact of his presence here. Owing to intelligent attention to the conditions of conserving personal working power he is middle aged in what most people would call old age. What we see in his person I believe is available to the average individual. In fact, when we get fairly started on the preservation of life at middle age, we shall discover a great deal that we now do not know and will improve to that extent the possibilities in the case. But even now the possibilities are so gigantic that I scarcely dare trust myself to tell you what faith I have in them. Your governor has quoted to you the opinion of the New York health office that the expectation of life at middle age could be improved at least five years. In my estimation, this is putting it very mildly indeed. While I will not try to substitute any higher figure I want to say that I believe the real possibilities, as they will be demonstrated in the next generation, will be several times this figure.

My chief business in life is that of an economic statistician, and I do not hesitate to say that while vital statistics are ordinarily regarded as beyond the realm of economics, to me there is no economic problem of so vast importance, there is no economic saving of so colossal proportions, as that connected with the saving of human life, especially at middle age. We should emphasize this, not only because the saving that is possible is large, but also because that saving is not being made. I believe that it is in this direction that a new start should be made in the public health movement in Massachusetts and, fol-

lowing Massachusetts, throughout the United States.

Our progress so far has been chiefly in the direction of saving of human life from the ravages of infectious or acute diseases, whose main impact is in infancy and early life. Wonderful strides have been made in the field of public hygiene. Plagues and pestilences are no longer the dread scourges they once were. But we have utterly neglected the fight against the diseases which your governor has referred to as those of wear and tear. For practical purposes we may roughly divide human diseases into two kinds, the acute or infectious, of which typhoid fever is a type, and the chronic or degenerative, of which heart disease, Bright's disease and arterio-sclerosis are types. We have made little if any progress in fighting these terrible maladies of middle life. I say we have not; I mean we have not in America, for the mortality from these diseases has increased 86 per cent. in the thirty years preceding the last census. But we have the example of Europe to show that progress can be made, for while we have been going backward Europe has been going forward.

A contrast between the conditions in this country, taking New Jersey and Massachusetts as examples, and England, show that at early ages there has been a saving of human life in both countries. There has been a substantial lessening in the death-rate for infants in both countries. At age ten there is some saving, although not very much in either country. At ages fifteen, twenty, twenty-five, thirty, thirty-five there continues to be some saving. But in Massachusetts and New Jersey there has been an increase in the death-rate at age forty and above, the increase going on more rapidly as old age is approached, the death-rate over seventy-five having increased enormously.

Not so in England, however, which shows a saving even up to old age, a saving as great as the loss for us. The reason for this difference is that in England, as also in France, in Germany, in Sweden, and in most other European nations, there has been a decrease instead of an increase in the wear and tear diseases.

The death-rate in the United States from apoplexy was less twenty years ago than either ten years ago or today. In the same way, diseases of the urinary system show a progressive increase during the three decades ending with 1890, 1900, 1910 respectively, the census years for which we have such statistics. Diseases of the heart and circulatory system in the same way have increased from thirteen to nineteen per one hundred thousand in the three decades. The three kinds of diseases combined have increased from twenty-seven to thirty-eight per one hundred thousand in the twenty years (1890–1910)—a very steep ascent. In England, however, we find a descending trend about equal to our ascending trend. It is because these diseases which are the degenerative diseases and the diseases which affect the death-rate in middle life are increasing here while lessening abroad, that we are increasing the death-rate after middle life, instead of decreasing it.

I wish to give you at this point the results of the experience of the Life Extension Institute in regard to the degenerative diseases. The Life Extension Institute, which your chairman has mentioned, has been established in order to help work out this problem. Ex-President Taft is the chairman of board of directors. General Gorgas is consultant in sanitation. Many of the health experts in this body and on this platform are members of the hygiene reference board of ninety-four of the best health experts in the United States. The object is to prolong human life, with special reference to safeguarding middle age. In order to do this, and to bring home the responsibility to each individual, we give, through medical examiners located throughout the United States, individual health examinations. The object of these examinations is that individuals may find out exactly what, if any, are their peculiar and especial disabilities. Then such individuals are put in touch with their family physician, and the family physicians are told what facts were discovered from the physical, urinary, blood, or other examinations. The family physicians are also given the benefit of whatever information the Life Extension Institute as a central body has been able to assemble, that may be of assistance to them in treating their patients.

When we made our first contracts with life insurance companies to examine their policy holders and learned the appalling results of the first examinations, we wondered, inasmuch as only between 5 and 10 per cent. of the policyholders who had the privilege of free medical examinations took this privilege, whether the terrific amount of degeneration that was found among them was really representative of the general population. It might, we thought, be due to a selection, to the fact that only the human wrecks chose to be examined. But recently we have been making examinations of the employees of whole institutions, large banks and other industrial concerns in New York City, and we find almost the same conditions there. Out of two thousand such examinations among young men and women of an average age of thirty-three, just in the early prime of life, men and women supposedly picked because of their especial fitness for work, only 3.14 per cent. were found free of impairment or of habits of living which are obviously leading to impairment. Of the remaining persons, 96.69 per cent. were unaware of impairment; 5.38 per cent. of the total number examined were affected with organic heart trouble; 13.10 per cent. with arterio-sclerosis; 25.81 per cent. with high or low blood pressure; 35.63 per cent. with sugar, casts or albumin in the urine; 12.77 per cent. with combination of both heart and kidney disease; 22.22 per cent. with decayed teeth or infected gums; 16.03 per cent. with faulty vision uncorrected. These figures are especially surprising because of the large number of young men and women suffering from diseases of the heart, kidney and circulatory system. The fact of greatest import, however, was that impairment, sufficiently serious to justify the examiner in referring the examinee to his family physician for

medical treatment, was found in 59 per cent. of the total number of cases, while 37.86 per cent. were on the road to impairment because of the use of "too much alcohol" or, "too much tobacco," constipation, eye-strain, overweight, diseased mouths, errors of diet, and so forth.

And what is the cause of this appalling increase, in the United States, of these and other degenerative diseases? I believe it can be shown to the satisfaction of any reasonable person that the increase is largely due to the neglect of the individual hygiene in the United States. It is due, first, to ignorance of individual hygiene; second, to indifference to individual hygiene, and third, to sheer inability to practice individual hygiene because of industrial conditions which do not permit it. All three of these evils must be corrected, and the boards of health of cities and of states can do much to correct them. In Massachusetts the need, while perhaps not as great as in some other states, is still very real, for there has been an increase in the diseases of the heart, arteries, kidneys, in apoplexy and in paralysis.

The difficulty is that our attention heretofore has been too largely engrossed with public hygiene, so called. As Rubner has said: Too much attention relatively has been hitherto put by health officers on bacteriology as compared with common physiology. The public health officer in this country has not regarded himself as a teacher of individual hygiene. He has not thought it necessary even to mention the alcohol question. He has not thought it necessary to consider problems of ventilation, of dietetics, of auto-intoxication, of exercise, of fresh air, of rest, of recreation; but before we can really cope with this public health problem we have got to take these things into account. As I see it, the great work for the health officer of the future, without any relaxation in the fight against the acute or infectious diseases, will be to get the cooperation of the public in personal hygiene.

The best way the health officer can help the public will be to show the public how to help themselves. You know there are religionists who like to delegate all their religion to the high priest, and hitherto the public have regarded you health officers as the high priests of health. They must now be told that they also have a responsibility, and they must be shown how to discharge this responsibility. They must be taught to protect themselves from the degenerative diseases which are the result of intemperate eating and drinking, bad air, overstrain, worry, and the other innumerable evils that accompany our present-day civilization. If a man were suddenly afflicted with smallpox or typhoid fever or any other acute malady, he would lose no time in getting expert advice and applying every known means to save his life. But his life may be threatened just as seriously, though possibly not as imminently, by arterio-sclerosis, heart disease, or Bright's disease, and he will do nothing to prevent the encroachment of these diseases until it is too late, but will continue to eat as he pleases, drink as he pleases, smoke as he

pleases, or overwork, and worry himself into a premature grave.

It is as though a man driving an automobile were to continue blindly on his way, never pausing to tighten a nut or to mend a punctured tire, never allowing his engine to cool when it got overheated, feeding it too much gasoline when it was going down hill, and blissfully thinking that his car was in good condition so long as it did not stop. You know as well as I that it would stop, long before its maker had intended that it should, if the simple care which is necessary to keep it in good condition were not given it. There is no doubt that the human machine is more delicate and complicated than any machine made by human hands. And yet the man who would be most careful of his automobile, who would have it examined by an expert at least once a year to see that it is in good running order, who would think the other man I mentioned an irresponsible idiot, is in many cases, either amused or annoyed if told that he should keep his own machinery in good running order by care and inspection. As long as he is not sick in bed he thinks there is no need of looking after his health.

And this is the problem which lies before the health officers—to change the suicidal attitude of the ordinary individual. To do this we must get our health ideals on a different basis. We must put before the individual, as his ideal, physiological habits of living. Human life must be brought into conformity with physiological science. There are two great influences acting on life, one to do a thing because it has been done, whether it is right or wrong, and the other to do a thing because science shows it to be right. We have been following the first of these—custom; we need now to follow science. The reason that Japan has made so much progress as to astonish the world in the last generation is because an emperor of Japan said: "Let us henceforth follow reason instead of tradition." It seems to me that is exactly the motto which the health officer should take for himself. Let us follow reason instead of tradition.

But you say: "This transformation from tradition to science cannot be accomplished,—it cannot be done, because we have certain customs and habits which you cannot break." But it can be done, and it has been done in certain regards. The tuberculosis movement has shown the way. I can remember when I myself was a victim of tuberculosis; sleeping out of doors was regarded as a very queer method of combating the disease, and something that no well person would think of practicing; but in the short space of fifteen years there has been a revolution of opinion on this subject and to a large extent a revolution of habit. Outside sleeping in other than mild climates was started by Doctor Millett, whom I see in the audience. It was he who was the pioneer in that breaking with old custom and defying fear of night air and damp air. And sanitoria all over the world have followed his example. Consequently, there has been a revolution in the point of view so far as air is concerned. I remember some twelve years ago,

when we first started a tuberculosis institution in New Haven County, we put a lay figure of a woman out of doors over the street, opposite a tuberculosis exhibit so that people passing by would be attracted and come in. So lifelike was this lay figure that many people thought she was alive and protested that we should allow such "cruel exposure" in the sharp March air. Today we have in New Haven County a sanitorium where a hundred men, women and children, are sleeping out of doors, not only in March but in January and February and throughout the year, whether it is cold, windy, damp, or dry, and nobody thinks anything of it.

Another illustration may be found in the sour milk craze which, when it had the backing of a scientific man in Paris, swept all over the world.

Again, you know, many of you, that there was one health officer who was responsible for a safe and sane Fourth, who revolutionized the national patriotic customs of this country. When Doctor Evans of Chicago, eight years ago, first began a crusade for a safe and sane Fourth, with no other assistance than the proprietor of the *Chicago Tribune*, he was laughed at, and was told even by sympathetic people: "You cannot change the customs of an entire country. The public want an unsafe, an insane Fourth of July." But by dint of persistence, intelligence and the use of the newspapers, the thing was done in less than a single decade. If such a change can be brought about, cannot we, if we all pull together, make a very considerable change in every phase of personal hygiene, including the alcohol problem, and have not we now the best opportunity that the world has ever seen?

As Doctor Eliot has told you, and as we know from reading the daily papers, one of the effects of the European war has been the loosening up of established custom and the emphasis on scientific efficiency as superior to custom. Hence it is that all these nations, in order to get the best out of their soldiers and the best out of their workmen making munitions of war, are now fighting alcohol. They are also studying dietetics. The Life Extension Institute has been applied to help in this movement abroad. Is it not a glorious opportunity for America? While Europe is trying to save human life in order to spend it, why shall not we try to save human life in order to save it? What we can gain is so large, and the present is so magnificent an opportunity for it, that I hope this conference will be the starting point for what Doctor Eliot has called an educational program.

And when we have got all that modern physiology can teach us we shall find ourselves simply going back, with some improvements, to the primitive ideals of ancient Greece, the ideals of a sound mind in a sound body. The health ideals of the Greeks entered into their daily life. Their education consisted, as they said, of music and gymnastics, by which they meant much more by music than we do, and much more by gymnastics. They have handed down to us in imperishable marble their ideals of the human form, their ideals of athletic development,

whereas we today leave athletic development to the prize fighters. Why shouldn't we readopt these old Greek ideals and make them a part of our American ideals? They should enter into our daily habits. They should enter into our literature. They should enter into even our drama.

I am glad to see that Percy MacKaye, who visualized in St. Louis so wonderfully by a masque certain ideas which were then supposed not to be capable of visualization, is here today on the platform. He and many others of us have become enthusiastic over the idea of a health and peace masque, pageant, drama and exhibit, which will show in much the same way and by much the same methods, but with different subject matter, how, while Europe wages war, we devote ourselves to the ideals of peace and health.

Whatever the ultimate ways and means of conserving the prime of life, the immediate task before us is to recognize the need of applying the science of physiology to the individual, to preach the gospel of physiological living to the public and, so far as possible, to practise what we preach.

WHAT MASSACHUSETTS HAS DONE AND MAY YET DO FOR THE PUBLIC HEALTH.

Prof. William T. Sedgwick,
President of the American Public Health Association.

THIS gathering is an inspiration, and no body of people in the United States will feel more proud of its success today than the American Public Health Association, three past presidents of which are sitting behind me upon this platform. That great body, which comprises now some 1,400 persons interested in the public health, will be glad to hear that Massachusetts is taking a new lease of life in public health matters, is keeping its face toward the sunrise, and is joining to the forces having to do with preventive medicine and public sanitation, last but not least, that great work of personal hygiene, aspects of which Professor Fisher has just been dwelling upon.

But, my friends, you and I stand upon the shoulders of the past. Massachusetts has long been a pioneer, and, though a Massachusetts citizen, I want to speak today more as president of the American Public Health Association and give to Massachusetts the honor that is her due for the work that she has done hitherto,—first, in the line of preventive medicine. Very early in the history of smallpox in prevention by inoculation, Massachusetts led with the name of Boylston. Then, when vaccination came on, she again led with her experiments in Boston and Milton, laying the foundations of experimental medicine, and with the name of Waterhouse bringing added distinction to American medicine and especially preventive medicine. And again, the names of Lemuel Shattuck and of Edward Jarvis of later date must never

be forgotten, the first a public health pioneer in the middle of the nineteenth century, the other a statistician whose splendid accumulation of statistical material forms one of the ornaments of the Boston Public Library.

Again, as has been said this morning, Massachusetts was one of the leaders in the organization of a state board of health, and the Boston Board of Health was one of the first to be formed, the state board in 1869, the city board in 1872. And again, in 1885 the Massachusetts Drainage Commission was one of the first in the world to report, and to do for Massachusetts very much what the Rivers Pollution Commissions of England did for England and Great Britain. It was in 1886, however, that the greatest step forward was taken, when our State Board of Health was formed to replace the State Board of Health, Lunacy and Charity which had shortly preceded it, succeeding the original State Board of Health. Fortunately for leadership in the new board a member of the Massachusetts Drainage Commission and of the old board was at hand in the person of Dr. Henry Pickering Walcott, a brilliant and able leader, and with him was immediately associated—and this was a very remarkable step forward—an hydraulic engineer, Mr. Hiram Francis Mills, then of Lawrence, now of Lowell. So that the new board consisted of a leading authority on state medicine, Doctor Walcott, as chairman, and a leading engineer as chairman of the Committee on Water Supply and Drainage. The like of this had never been known before in any country, and its novelty was abundant testimony to the leadership and wisdom of the state of Massachusetts. And now, for these many years, these and other devoted men upon the old State Board of Health have given without pay—and sometimes unhappily without reward—to the state of Massachusetts their services, their devotion, their intelligence, their scientific skill and ability.

Today we have a new arrangement, and one which is promising even greater things in the future; for each age, standing upon the shoulders of the past, ought to be able to improve upon the last. A brilliant leader has come to us—thanks to the governor—from the United States Public Health Service, which is today in effect a National Department of Health and is doing all that any national department of health can do at this particular juncture of our development. Doctor McLaughlin has come to us with an experience derived from that remarkable service. He has worked in Europe. He has worked in the Philippines. He is no tyro in public health matters. And he is one of the first to say that Professor Fisher is right, and that without abating one jot or tittle of that splendid work which the state has been doing in preventive sanitation and in preventive medicine we should now pass on to preventive hygiene, the last and highest step, and also, I regret to say, the most difficult in the public health campaign.

Yes, friends, the state of Massachusetts has been a leader in preventive medicine. I have mentioned the names of Waterhouse and of Boylston.

It has been no less a leader in preventive sanitation. I have mentioned the names of Walcott and of Mills. We have now to move forward into preventive hygiene. And I see that I have made one serious omission. One of the finest things that the late State Board of Health did was to bring to this state the most distinguished man of medicine in the United States, Theobald Smith, and they brought him here for purposes of preventive medicine. The guardianship which he has kept over the antitoxins and the vaccines which have been used upon our children all these many years can never be overestimated or repaid by the state of Massachusetts, and it is with the greatest regret that we are surrendering him at present to the Rockefeller Institute. But our gratitude and goodwill go with him.

With preventive sanitation secure in the improvement of our water supplies and our sewerage systems, with preventive medicine strong in the past and strong today under Doctor Rosenau—able successor of Theobald Smith in this splendid work—we have still before us this preventive hygiene of which President Eliot has sketched so splendid an outline and which Professor Fisher has so ably commented upon.

I had intended to touch upon this also, for a part of my title is what Massachusetts may yet do,—what she has done, what she may yet do; but these more able speakers have already so thoroughly plowed the soil that I am sure there is very little left for me to do. Certainly I do not propose to harrow it,—or you.

Yet there is one thing that I am going to say in this connection, and that is that this increasing death-rate above forty, seems to have—at least I strongly suspect, though I cannot quite prove it today—some relation to the sexes. It appears to be the men particularly who are dying more rapidly above forty, and I leave it with you to discover whether this is, indeed, a fact or only an apparent circumstance, and if it is a fact to inquire why. But surely when one has reached my age and looks about him to see men like Governor Guild dropping by the way at fifty-six, and to have seen men like President Walker of the Institute of Technology likewise dropping out at about that age, and Phillips Brooks, and many more, something is wrong, and it seems to me that I see more widows about than I do widowers. While it is a very cheap and easy answer to say that there is a reason for this which is obvious to anybody, the figures do not bear it out. The fact seems to be that in the strain of modern life it is the men who are very largely falling by the way, and if this is true, and I don't know yet absolutely that it is, then that should give us pause. We should consider what it all means, for what did it not mean to Massachusetts to lose Phillips Brooks and General Walker and Curtis Guild long before their time? The same thing is going on with others almost every day, and it is, as these men have told you, time to attack alcohol and high living and overwork and a thousand other things that we

do at and beyond middle age which we ought not to do.

And here we must fall back, as Professor Fisher has rightly said, on the physiologist, but I have not found that the physiologists are sufficiently awake to the problem. They teach us physiology, most excellent physiology, but there still remains the teaching of personal or preventive hygiene, and that is the problem which boards of health, health officials, medical men and sanitarians have to face in the next few years.

Now may I not say also a word as member of the Public Health Council of the State Department of Health? The council rejoices, I am sure, in this splendid attendance and evidence of interest. We hope that the name of every person who has been here today will be turned in to the ushers, for we believe that these names will constitute a nucleus around which we may build. We rejoice in the lesson concerning public health nursing which has come to us from New York, and which has been so ably given to us. We rejoice also to know that our own instructive District Nursing Association, in its last annual report, has emphasized this matter, as it ought to do, and that Miss Beard and her supporters and her coadjutors are fully awake to the need of proper public health nursing. But may I not make one suggestion here? In my opinion it is not enough to take an ordinary trained nurse and simply fix a label upon her stating that she is a public health nurse. We want, as Miss Crandall has rightly said, something more than bedside nursing. We want first of all real women, with red blood and sympathy and kindness of heart in them, and not mere machines for doing what somebody has taught them in the training school to do; and then, in the second place, we must teach them more than we have ever taught hitherto about hygiene, and public hygiene, and preventive medicine, and all those things, so that they shall at least have a point of view. How shall they teach unless they are taught? And, finally, we must give them adequate reward; we must give them recognition and proper recompense; for the work that they will do will be among the most important labors that public health workers shall undertake in the next generation.

And then our boards of health, our local boards—the State Department of Health can do nothing without the adequate support of the local boards of health, and our first duty, your first duty, the first duty of the public, is to see that these are well constituted, of intelligent, active, informed, sympathetic citizens. In the second place, they must call to their aid expert service. We need trained health officers. If we need trained public health servants, if we need a trained state commissioner of health, such as we have, surely we need trained health officers all over the state. Here, again, it won't do to take an ordinary doctor and put a label on him saying that he is a health officer. He, too, must be specially trained. *Training* is the key note of the time, *education* the foundation of service. It may be that some of you will need to coöperate, some boards of health getting

together, instead of standing off and jealously watching their neighbors. See if you cannot get together and work as they are working at Framingham and Wellesley and other places, pooling the sums of money which they have and getting expert service, as we long ago got it in our public schools. There was a time when every school district felt that it must have a separate superintendent and must stand on its own independent legs, and then it was discovered that a superintendent could be hired for a large area and furnish expert service to a number of towns. Why not apply that idea to our boards of health, or some other idea, and at any rate get *expert service* somehow?

But, as I say, the time is going and this topic is most engrossing. I must, before stopping, however, say one thing more. Yesterday a number of us received from the American Red Cross in Washington telegrams saying that Doctor Strong had cabled for a large number of doctors, sanitary inspectors, sanitary engineers and others, to help him in the work in Servia, and immediately those of us who got these telegrams set to work, and I am happy to say to you that, although we did not receive them until late yesterday afternoon, already a number of volunteers of the right type have come forward, physicians, sanitary inspectors and sanitary engineers, so that by the 13th of May, when these people are to leave the country, we hope that a properly trained group of health officials, inspectors, physicians and others, will be ready to go and uphold the strong arm of Doctor Strong. Thus, my friends, does the local problem reach out into the wide, wide world. Servia today is suffering from typhus. She has returned to the middle ages, to the jail fever, or ship fever, or camp fever, that we thought was extinct, and vermin are carrying this fever abroad. It is your duty and mine to uphold the work of those who are there, first, with money, second, with sympathy, and third, with the forwarding of supplies and expert service. The call is for capable, well-trained volunteers, medical men, sanitary inspectors, and sanitary engineers. Some of these eager to go may be in this audience.

THE MORNING SESSION WAS CLOSED BY DR. ALLAN J. MCLAUGHIN, MASSACHUSETTS STATE COMMISSIONER OF HEALTH, WHO SPOKE AS FOLLOWS:

One advantage of being the last speaker is that you have an excuse always for cutting it short. In view of the fact that the subject has been so well covered I may well do so. There are one or two points I would like to bring out, however.

In the first place, I want to accentuate the fact that there is a limit to the possibilities of official action in combating contagious and other diseases. All health officers know—it makes no difference what the health problem may be—that, after all the factors in these problems are corrected that are corrigible by official action, there remains always a residuum of disease; for instance, in typhoid fever, called residuary typhoid, with which we are satisfied to live, and which under the old idea was considered an inevitable visitant, which we simply had to stand for. It is this that we are trying to get rid of, and this is beyond official action except as offi-

cial action extends through education, because it is corrigible only by the individual effort of the individual citizen and by the activities of the individual citizen in personal and family hygiene. Preventive medicine is an exact science, based on the precise knowledge of the cause of disease and the methods of spread of disease, and of the habits and weaknesses of the germs that cause disease. I will say no more on that line, except to accentuate that what we need is not more knowledge of preventive medicine but a wider and a more vigorous application by everybody of the knowledge that we already possess. This is our problem, and this can only be changed by the application of educational methods in personal hygiene; the education of the individual, also, in his obligation to his neighbor, that in practicing personal hygiene he is not only working for himself but he is fulfilling his obligation not to spread disease among his neighbors.

The practicing physician has been enlisted by us in this campaign of education in personal hygiene; we may count upon his loyal support, but there are thousands and thousands of people who never—or rarely—call a physician. The great submerged tenth, or in larger numbers the other half, as it has been called, cannot be reached by the educational efforts of the practicing physician, however well intentioned he may be. There is only one way in which this sanitary instruction can be carried into the home, and that is by the public health nurse. And I venture to say that the future reductions in the death-rate in this state will be chargeable directly to this agency, and will be in direct proportion to the number of public health nurses engaged in this work.

The type of woman necessary is something more, as has been indicated, than a nurse. She must have the milk of human kindness. She must have tact, patience, human solicitude for suffering, and sympathy for the poor, because the poor are sensitive, and her efficiency will be impaired 75 per cent. if she looks down upon them from a great height. These are the great qualities that she must have, in addition to her technical training.

There is one other point, and one which has been touched upon, and that is that the public health nurse must not be a specialist; she must not be a tuberculosis nurse or a baby hygiene or school nurse; she must be a public health nurse, because in this state and other states there are many towns of ten thousand or fifteen thousand that can well afford to employ one nurse as a public health nurse engaged in three or four activities, when it is out of the question for that town to employ one nurse for each activity. So that the public health nurse of the future must be well trained in all these branches of preventive medicine and be able to exercise all these activities in the town in which she may be employed.

I will just touch one other great agency in this movement, which is secondary only to the public health nurse and in which the public health has a part, and that is child hygiene and the possibilities of medical inspection of school children. This is the most logical point from which to attack the problem of tuberculosis. At present we are taking tuberculosis cases as we find them, and neglecting the opportunity of taking the school child, the flat chested, anæmic, ill-nourished child, who will surely become a victim of tuberculosis. We are at the present time in a haphazard way doing something in this line, but there is a woeful lack of coördination of effort, a great lot of waste motion and lost energy because of the lack of a central directing power to secure uniformity of method and coördination of effort in our medical inspection of schools.

I believe that the time has come when we need and must have a state-wide organization, which will include all those interested in the teaching of hygiene—health officers, practicing physicians, examiners of schools, public health nurses, school teachers, and every other agency that is engaged in the teaching of hygiene in any way, and I believe when we get such an organization we will begin to make real advances in this great field of preventive medicine. With such an organization we can work for common objects. We can coördinate our efforts. We can do away with this waste motion and lost effort and duplication of work. And I may say also that we may do away with some of the pitiful little jealousies and criticisms and antagonisms that have developed because of the different agencies and entities that are directing these various lines of work which should be put under one directing agency of some kind. We don't care what that agency may be. We don't care where the authority may be. We don't care where the credit

may come. What we want is to get coördination of effort and coöperation of all who are engaged in this great movement. I believe that the time has come for such a state-wide organization, and I leave it to you to work out the details.

There is just one other thing, and that is this: I believe that such an association as the Massachusetts Association of Boards of Health should not have a single health officer outside of its fold, and yet there are dozens of Massachusetts health officers and health officials who do not belong to that society and take no part in its wonderful work. Just as I believe that the 1,400 members of the American Public Health Association should be 14,000 or 140,000, and not leave all the work to a few men who are giving their lives to it. It is everybody's duty, and that extends to the limits of the Commonwealth, to every individual citizen in the Commonwealth.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

The regular quarterly meeting of the Massachusetts Association of Boards of Health was held in Kingsley Hall, Thursday, April 29, 1915, with the president, Dr. Milton J. Rosenau, in the chair.

The reading of the record of the last meeting was omitted.

It was voted that the following applicants, having been recommended by the Executive Committee, be elected to membership in the association: Dr. Clarence J. Allen, 38 Church St., Winchester; Willis C. Bacon, Board of Health, North Adams; Sarah Beatty, R. N., New England Hospital, Dimock St., Roxbury; Dr. Conrad Bell, Board of Health, Waltham; Mr. Charles W. Birtwell, 6 Hancock Ave., Boston; Dr. William M. Bodwell, 2 Lexington St., Framingham; Francis Brown, Washington Sq., Salem; John J. Burke, 224 Beech St., Holyoke; (Mrs.) Annie M. Chaffe, 25 Dover St., Boston; Dr. Gilman L. Chase, Clinton; H. W. Clark, Room 502, State House, Boston; Augustus S. Cleaves, Gardner, Mass.; Dr. William Hall Coon, 92 Main St., Haverhill; Dr. Simon F. Cox, Superintendent New Haven Hospital, New Haven, Conn.; Dr. Eliza J. Dadmun, 1376 Commonwealth Ave., Allston; Thomas J. Dockray, 44 High St., Canton, Mass.; Harrison P. Eddy, 14 Beacon St., Boston; Dr. David L. Edsall, 80 Marlborough St., Boston; Mr. Philip V. Erard, Board of Health, Springfield; Dr. David H. Fuller, Bradford Ave., Fall River; Otto K. Gatzke, 7 Mt. Pleasant St., Webster; Joseph R. Glennon, 679 Cottage St., New Bedford; Miss Ellen Hale, 3 Charles River Sq., Boston; Dr. Clement H. Hallowell, 688 Washington St., Norwood; John Higgiston, Board of Health, Milford; Dr. Laura A. C. Hughes, 98 Huntington Ave., Boston; Thomas E. Hunt, City Hall, Newport, R. I.; Douglas W. Hyde, City Hall, North Adams; Edward A. Ingham, Massachusetts Institute Technology, Boston; Dr. L. C. Jones, Board of Health, Falmouth; Dr. Eugene R. Kelley, State Department of Health, Boston; Dr. Francis H. Lally, Board of Health, Milford; Dr. J. E. Lamb, 935 Winthrop Ave., Revere; Miss Julia May Leach, Superintendent, Addison Gilbert Hospital, Gloucester; George S. Lennon, Board of Health, Haverhill; Hermann C. Lythgoe, 501 State House, Boston; Dr. Eugene J. McCarthy, 17 Gamet St., Malden; John J. McDonough, 100 Belgrade Ave., Roslindale; Mrs. Fannie W. Marsh, R. F. D., Reading; Prof. Charles E. Marshall, 44 Sunset Ave., Amherst; John F. Monaghan, 2 Oak St., Waltham; R. S. Nye, Board of Health, Falmouth; Dr. J. U. Paquin, 1306 Acushnet Ave., New Bedford; Henrietta E. Patten, 209 Riverbank Ct., Cambridge; Bernard Peterson, 419 Salem St., Woburn; Dr. Laurence L. Pierce, 10 Central St., Arlington; Dr. William J. Powers, 225 High St., Holyoke; Daniel L. Prendergast, 101 Milk St., Boston; Maurice J. Quinlan, Board of Health, Milford; Dr. Norman P. Quint, Board of Health, West Medway; Mrs. Ada E. Sheffield, 60 Shepard St., Cambridge; David M. Smiley, Board of Health, Mansfield; Dr. A. L. Stone, Waltham; Ralph R. Stratton, Board of Health, Melrose; Dr. T. L. Swift, Board of Health, Falmouth; George W. Tupper, 74 Pleasant St., Brookline; Dr. George

B. Underwood, Board of Health, Gardner; George V. Wager, Russell; Margaret E. Whitechurch, Hotel Oxford, Boston; Dr. Frankwood E. Williams, 313 Ford Building, Boston.

The following resolution on the death of Dr. James B. Field of Lowell was read and unanimously adopted.

WHEREAS, Dr. James B. Field of Lowell, a member of the Massachusetts Association of Boards of Health and at one time chairman of the Lowell Board of Health, died at Lowell on April 15, 1915, and

WHEREAS, The records show that Doctor Field was a founder of the Association, having been one of the thirty-five men interested in public health who met at Huntington Hall on January 11, 1890, for the purpose of forming a "society, comprising the various boards of health of the state of Massachusetts." He acted as secretary of the meeting and was one of the committee of six appointed to draft a Constitution and By-Laws, and

WHEREAS, at the first regular meeting of the association, held at the Revere House on March 19, 1890, Doctor Field was elected treasurer, holding that office until his resignation in January, 1911, and

WHEREAS, The records further show that Doctor Field retained his membership in the association for a quarter of a century, taking an active interest in its work, it is therefore

Resolved, That the Massachusetts Association of Boards of Health, realizing the loss which it has sustained by the death of Doctor Field, make this formal acknowledgment of its appreciation of his services to the association, and it is further

Resolved, That these resolutions be placed upon the records of the association and a copy thereof sent to Doctor Field's family.

It was unanimously voted that the distinguished and long services with this association, as well as with the health of the Commonwealth, rendered by Dr. Henry Pickering Walcott, shall be in part recognized by electing him an honorary member of this association.

The following papers, printed elsewhere in this issue, were then presented:

"The Control of Communicable Diseases," Dr. Eugene R. Kelley, Director, Divison of Communicable Diseases, State Department of Health;

"The Relationship between the State and Local Boards of Health," Dr. Lyman A. Jones, District Health Officer, Berkshire District.

"The Health of the Farmer," Dr. John S. Hitchcock, District Health Officer, Connecticut Valley District.

"Vacation Health Problems," Dr. Adam S. MacKnight, District Health Officer, Southeastern District.

"The Continuing Problem of Vaccination," Dr. Samuel H. Durgin, Past President, Massachusetts Association of Boards of Health.

"The Control of Cancer," Dr. Edward Reynolds, Vice-President American Society for the Control of Cancer.

"Some Problems of the Health Officer of a Small City," Dr. George Francis Curtis.

THE CONTROL OF COMMUNICABLE DISEASES.

DR. EUGENE R. KELLEY,
Director, Division of Communicable Diseases, State Department of Health.

POSSIBILITIES.

NEARLY forty years have passed since Pasteur startled the civilized world by his dramatic statement, "It is within the power of man to abolish contagious diseases from the earth." It seems quite clear now that few, if any, of his contemporaries grasped the full significance of this prophecy. It is probable that most of them believed that it was merely the idle dream of a visionary. Yet each year only shows more clearly the great fundamental truth of this prophecy. Few now doubt the literal truth of his contention. Whether

mankind ever completely realizes the vision and actually *does* abolish all contagious disease depends entirely upon whether mankind is willing to pay the price. The price can be partly expressed in terms of money, but even more in terms of work and investigation, of cheerful acceptance by the individual of restraint and inconvenience for the benefit of the many, and above all of widespread universal education in the simple fundamental principles of hygiene.

Achievements up to the Present.

The most encouraging hope and promise for the future in any consideration of this subject is in the achievements of the immediate past. It is no exaggeration to say that until the past half-century mankind never made any *intelligent* advance against communicable diseases. Their true nature was entirely unknown, and without this fundamental knowledge, any real progress was impossible. Since the discovery of the true causes of communicable diseases phenomenal advance has been made, even though the exact nature of the causative germs of some of them baffles our best investigators to this day. Yellow fever, Asiatic cholera, typhus fever, for instance, have all been eradicated from our shores or kept at a negligible minimum as causes of sickness and death. Yet all of these terrible pestilences have ravaged cities of this country within the recent past and would do so again tomorrow were it not for the continuous vigilance of the guardians of the nation's health.

Among our common every-day communicable diseases the results are no less gratifying and astonishing. That deaths from consumption in this state today are only a little more than half; from diphtheria and typhoid less than one-quarter as frequent as they were twenty years ago, is a cold, hard fact—but it is something more than that. It is a wonderful monument to the intelligence, self control and public spirit of the citizens of the Commonwealth; to the skill and devotion of the medical and nursing professions; and especially to the zeal, wisdom and devotion to the public good of the officials of both the state and local boards of health of the Commonwealth during these past two decades. It is impossible to surpass this record for several of these diseases for they have left us only a fraction to overcome ere we extinguish them utterly.

But the fact that the pace already set is a hard one to follow should only stimulate us the more to do our utmost. If anything more is needed to make us realize that our problem in these matters is one to challenge the best there is in us, the knowledge that this "residuum" of preventable diseases, passed on to us to extinguish, is of necessity the hardest part to stamp out, else it would have been stamped out already, ought to make us realize the magnitude of our task.

Constantly each year about 300 deaths from typhoid, 500 from diphtheria, 4,000 from consumption, 6,000 from pneumonia; a less constant but considerable number from scarlet fever, measles, whooping-cough, infantile paralysis and epidemic meningitis; and a largely unknown but unques-

tionable large number of deaths from syphilis and gonorrhea, stand between us and the realization of Pasteur's prophecy for Massachusetts.

Essentials for Control.

This is our problem—what are the means that we must depend upon to solve it? To my mind the principal factors in the successful solution are:

1. A well working system of prompt reports of all communicable diseases to the health authorities from the physicians.

2. A carefully worked out routine system of study, and prompt investigation of all outbreaks, by the health authorities; in other words, health authorities that know their business and are "on the job," with reasonable, but not necessarily lavish, financial support behind them.

3. Regulations for the isolation and supervison of persons ill with contagious diseases, based upon both common sense and scientific knowledge and the principle of maximum protection to the public with minimum inconvenience and hardship to the patient and family.

4. The safeguarding of certain important channels of disease transmission, especially the water and milk supplies.

5. The widest possible utilizing of certain public health machinery designed expressly to combat communicable diseases.

Under this heading would come:

(a) The public health laboratories—whether research laboratories where new knowledge of the nature of contagious diseases is constantly being sought and found; or diagnostic laboratories, where the practicing physician and the officials of boards of health can have the correctness of their diagnoses verified, or determine under what conditions it is safe to release quarantine restrictions; or laboratories where antitoxins, vaccines, and other preventive and curative sera are prepared and distributed.

(b) The dispensary and hospital for contagious diseases. Their obvious importance and significance need no special mention before this gathering.

(c) Public health nursing organizations.

(d) School medical inspection, so called; or, better, hygienic school supervision.

6. The greatest of all forces at our disposal, that of education along public health lines, especially education of children and mothers.

With the exception of the ever present possibility of a satisfactory solution of the milk problem, it would seem as if official action had gone about as far as it can in the abolishing of certain infectious diseases in Massachusetts.

Typhoid fever, scarlet fever, measles and whooping-cough can certainly be reduced still further in this state, but it must be largely through educational means through the intelligent coöperation of all the citizens of the state.

Our public health nurses, our system of school hygiene, our boards of health, our whole machinery for health protection needs to be adjusted to this one concept. The greatest need in public health today is education along

sanitary lines—the removal of old erroneous ideas and superstitions relative to the true nature of contagion and infection among the laity, and, to lesser extent, even among the medical profession. I do not believe that sanitarians stop to realize how tenacious these old ideas are, and how difficult it is for the laity to pick out the chaff from the wheat in the great sanitary grist that has gone through the mill of human intellect in the past few decades.

All who have made even a superficial study of the marvelous growth of knowledge regarding the causation and prevention of disease that has occurred in the past fifty years cannot deny that what is most needed now is not so much *more* knowledge—further light, beneficial as this will be—but assimilation of the knowledge the experts already possess. Sanitary science today is far more in need of its "Roosevelts" and "Billy Sundays" than it is of additional "Pasteurs" and "Listers." Or, as President Van Hise of Wisconsin University puts it:

"We already *know* enough to double the crops and eradicate the infectious diseases of this entire state. What is most needed now is wider practical education of the entire public so they will take advantage of the knowledge we already possess."

This, therefore, is the greatest reason why the cause of public hygiene is not better supported and the principles of both private and public hygiene no better applied by our individual citizens—lack of rudimentary training in the principles of hygiene.

Our great problem, then, as health officials, is to systematize, unify and coördinate our official health machinery so that we can turn all our resources as a unit against the ravages of preventable disease. But even if we do this to a degree hitherto unprecedented, we will most assuredly fail in the accomplishment of our great object—the freeing of humanity from the weight of needless disease and suffering—unless at the same time we succeed in enlisting the general public with us. This means hygienic education, and to bring this about we must have three great agencies.

1. The public press.
2. Individual teaching.
3. The schools.

The press is always very willing to help, but the trained worker who knows how to put hygienic facts into attractive newspaper form is a most necessary and valuable asset in publicity work. Individual teaching should be conducted by local health officials, by state officials, and especially by public health nurses. In their daily routine work, they should explain *why* certain courses of procedure are necessary and not simply say that they *must* do thus and so; for example, in regard to the question of quarantine. The schools are our chief hope in spreading the doctrine of proper living and correct application of the laws of health. These means, I believe, should form the nucleus of public health coöperation in the control of communicable diseases.

THE RELATIONSHIP BETWEEN THE STATE AND LOCAL BOARDS OF HEALTH.

Dr. Lyman A. Jones,
District Health Officer, State Department of Health, Berkshire District.

WITHIN the past few years interest in public health work has increased rapidly. There is a wider appreciation of the value and range of such work. Much has been accomplished, but the appreciation grows that there remains to be accomplished much more.

In Massachusetts this work was originally, and still is, in the hands of local boards of health, which largely constitute the supreme authority in health matters in their respective communities. Much of their work has been done without reference to its effect upon other localities than their own.

A community disposes of its waste, careless that in so doing it pollutes its neighbor's water supply.

A local board refuses to restrain milk production at a given dairy, though communicable disease may be present, because the product is sold in another town.

A health officer permits a contagious case to leave a hotel or boarding house and travel by public conveyance to another community, merely to relieve his own town of responsibility or expense.

St. Paul, in his Epistle to the Romans, says that "none of us liveth to himself alone, no man dieth to himself." This applies with equal force to communities as regards health matters, owing to the increasing complexity and intermingling of our present day life. Hence our state and national health organizations, which exercise their functions in the broader field, which seek to coördinate the work of the various units, and to supervise those larger phases of health work which extend beyond the limits of the individual community or state.

The relationship between the state and local boards of health should be a coöperative one. Each seeks to protect the public health, to prevent the spread of communicable disease, not merely to take care of sickness after it has occurred. Since their object is the same, they should work together in harmony. The local board needs the assistance of the health department in the management of those matters which extend beyond its own borders; sometimes it requires assistance or advice as to the solution of its own special problems; assistance is also needed for the furnishing of facilities—laboratory and otherwise—which many communities are themselves unable to provide.

And since the department, in large measure, is without standing in a given community, it requires the ready assistance of the local board in preventing conditions dangerous to the public health.

In other words, to secure the max-

imum results we must work together in the promoting and carrying on of public health work.

It will be helpful, perhaps, to consider briefly some of the things which we may well do together.

In the prevention and control of outbreaks of communicable disease, close coöperation is essential.

The local board of health can assist by enforcing the requirement that all such cases shall be reported immediately by physicians and householders, by investigating such cases to learn the probable source of infection, and by reporting at once to the state department as required under the law.

The state department can coöperate in the investigation of such outbreaks through the services of its district health officers.

It lends assistance in attaining a more accurate diagnosis by means of various laboratory tests, which are made without charge—the examination of nose and throat cultures for diphtheria bacilli; aiding in the diagnosis of typhoid or the discovery of carriers through Widal tests and examinations of blood, stools and urine for typhoid bacilli; making examination of sputum for tubercle bacilli, and shortly the department will begin the determination of the Wassermann reaction for the detection of syphilis.

The department also gives assistance by furnishing, without charge, antitoxin for diphtheria, vaccine for protection against smallpox, typhoid vaccine for the prevention of typhoid, anti-meningitis serum for treatment of cerebro-spinal meningitis, outfits of nitrate of silver solution for the prevention of ophthalmia neonatorum, and Pasteur treatment for the bite of rabid dogs.

Through the engineering division it contributes to the prevention of disease by examination of public water supplies, to ascertain their purity, and by frequent examination of suspicious private supplies.

Warnings are given regarding the presence of contagious disease in adjoining communities, making it possible for local boards in turn to be on the alert, enabling them to place physicians, teachers and the public generally on guard to detect the first suspicious case, for the success of preventive measures often depends on immediate knowledge as to the first cases, in much the same way that a bucket of water will put out a fire when it is small, while later it may burn itself out despite every effort.

The assistance of the local boards in bringing about the early and constant use of these facilities will greatly increase their value to the public.

Health education, a very important division of health work, which hitherto has been somewhat neglected, requires active coöperation, since the public will more readily submit themselves to inconvenience and restrictions, and will more willingly observe precautions, if they understand why such things are required.

Local boards of health can assist in this work of publicity by seeking out unsanitary conditions and making them known to their citizens so that public opinion may aid in their correction.

The disease reports for a series of years may be studied, foci of disease

discovered, and, by comparing results with expenditures, knowledge of results obtained may be brought to the public knowledge, thus forming a basis for asking proper appropriations for their work.

A close watch of records and reports of disease will make it possible, by timely public warning regarding the disease, to call public attention to the use of antitoxin in diphtheria, to emphasize the greater percentage of cures where it is used early, and to the advantage of immunizing doses; in typhoid, to explain that the infection is spread through food or drink, to point out the importance of thorough disinfection of stools and urine, and that questionable water supplies should be boiled before using; to make plain that measles and whooping-cough are dangerous diseases, causing more deaths than typhoid fever or scarlet fever, and that, combined, they are often more deadly than diphtheria, not to mention untoward after effects.

Through the state department assistance may be had in the way of support and advice in the solution of perplexing problems; speakers may be secured to address meetings and organizations upon health subjects. Various pamphlets or leaflets relating to health matters are available, and a monthly bulletin is regularly distributed.

The control and prevention of tuberculosis, which at present comprises no inconsiderable part of public health work, demands close coöperation between the state and local health organizations.

Cases are or should be investigated by the local health board, a sanitary history obtained, and pains taken to insure the protection of other members of the household.

With regard to tubercular hospitals and dispensaries care can be taken to secure competent and efficient physicians and nurses.

Because the prevalence of this disease is so intimately associated with economical and social conditions, and because its duration is so often protracted, there is special need that cases be followed up from time to time to see that they are taking proper care of themselves, and that the risk of infecting others is reduced to a minimum. Visiting nurses can best be employed for work of this nature.

The state department can help by advising individual communities how best to secure these results. It supplies circulars of information and instruction. Through its employees it makes special studies as to the presence of the disease, showing where work is most necessary.

There is time but to mention in this connection the possibilities in the way of instruction in schools through school physicians and nurses, of the great value of personal instruction through visiting nurses—this is especially effective in tuberculosis work—of the use of health exhibits, etc.

Time also is lacking to discuss the various ways in which coöperation may be carried out with reference to child hygiene, vital statistics and other branches of health work.

Enough has been said to indicate how intimate should be the relations between the state department and the local boards, and how essential for successful work is a sympathetic and hearty coöperation.

THE HEALTH OF THE FARMER.

Dr. John S. Hitchcock,
District Health Officer, State Department of Health, Connecticut Valley District.

THE advocates of the "outdoor life" as the only natural, healthy and perfect existence, suggest that the farm life is *the* life to lead; that the farmer, with his feet in the dirt, reposing himself and his ills on Nature's bosom, is the man of happy health and his children near to physical perfection. If this is so we ought to be able to show it by our figures. The death-rate and the infant mortality-rate of the farming community ought to be nearly as low as that of heaven. The farmer's opportunity for fresh air, fresh food and vigorous exercise is unsurpassed, and, if our sanitary beliefs will hold water, the exercise of these opportunities should be reflected in the vital statistics.

We find they are not.

Let me illustrate, by the unfair method of the records for one year, 1914, taken from two towns, both of them small, one a dairy, and one an onion and tobacco community. In the dairy town are only a few foreign-born people; the farmers are thrifty and they pride themselves on the health and longevity of the townspeople. The onion town has more than 50 per cent. of foreign-born inhabitants, most of them farm hands. It is a prosperous and supposedly healthy community. Both towns have substantially the same number of inhabitants.

In the dairy town:

Death-rate, 17.2 per 1,000 inhabitants.
Birth-rate, 9.1 per 1,000 inhabitants.
Infant mortality-rate, 571.4 per 1,000 births.
Of the total deaths:
40% were under 1 year of age.
0% were from 1 to 10 years.
0% were from 10 to 30 years.
14% were from 30 to 60 years.
46% were from 60 years up.

In the onion town:

Death-rate, 22.9 per 1,000 inhabitants.
Birth-rate, 46.9 per 1,000 inhabitants.
Infant mortality-rate, 285.7 per 1,000 births.
Of the total deaths:
19% were under 1 year of age.
47% were from 1 to 10 years.
0% were from 10 to 40 years.
33% were from 40 to 60 years.
1% were from 60 years up.

These figures do not compare favorably with heaven.

They indicate that the farmer's baby has a poor chance for life compared with the average baby, but that if they live through the first ten years they have an excellent prospect of living to a reasonably old age.

One circumstance must be mentioned that particularly influences such figures in a farming community, that is, the fact that a good proportion of the children have become disheartened by the severity of the life at home and are filled with the illusion that city life is easier besides being fuller of money and enjoyment than country life, and they leave home at the first oppor-

tunity to try their luck elsewhere. As a consequence, the population of a farming community is generally weak in young and middle-aged adults and has more than its due proportion of children and old people. This condition is true in the dairy town above mentioned but not in the onion town, where farm wages are so high that young adults remain.

Why are these things so? What are the outs about the farm life?

There seem to be three elements in the farmer's existence that are chiefly concerned in these results, viz.: isolation, ignorance, lack of cash money.

The farmer generally lives in what the city man would consider intolerable isolation. It is difficult for him to get to stores or to gatherings of people. He is so far away that he has few visitors, his doctor, even, has to travel miles to get to him. As a consequence an inflated spirit of independence is developed. He is king on his place and he keenly resents suggestions from outsiders, particularly if unsolicited, in regard to matters touching his own daily living, such as advice concerning sanitary conditions. His doctor is a long way off and doesn't enjoy being called for minor ailments, so that every countryside has an old woman or two locally much esteemed as amateur physicians. The children pay the penalty for this by dying at an unseemly rate.

The education of the average farmer is not carried to a high degree. His isolation makes it hard to send the children to the higher grades of schools and he needs their physical help on the farm as soon as they have grown in strength to the point where they can help. He is governed by tradition rather than by scientific teaching and his fathers were not so much enlightened as he is. The local "wise man" has as many followers in subjects of life in general as the old women have in medical matters. In direct proportion with lack of education is growth of suspicion. He has bought some gold bricks and distrusts any advice or offers of assistance that appear on the surface to be disinterested. He doesn't know whom to trust, and if he has an illness and the doctor first called doesn't "cure" him in a day he wants another one at once and discharges the first one. The results are not advantageous to him.

The farmer sees an astonishingly small amount of cash money in a year. His farm provides him with the main part of his food but with little actual money. A doctor costs money, medicines cost money, consequently home medical advice and home remedies are used far beyond their proper sphere. The results are evident in the infant mortality-rate.

The farmer's wife is the hardest worked person on the farm. She has to be on the jump all the time and she has no time left for the proper care of the children. Servants cost money, and money, on the farm, is used for more stock or fertilizer, not for house servants. Servants are hard to get. In a town where there is unlimited demand for women to work in the onion fields at $9 per week, do you imagine it is easy to get a house servant for $6, or do you think that the farmer's wife feels that she can afford one? In con-

sequence, the children are left to care for themselves to a large degree and they certainly do get hold of the queerest and most unwholesome things to eat. The answer shows in the infant and child mortality-rates given above.

In late years more attention is being paid to these outs of the farmer's life. Better roads give him more associates, automobiles cut down distances, telephones give quick communication, grange meetings not only teach him methods of improving his farm and increasing his net income but they also throw him among his fellow farmers in frank discussions of all sorts of problems, including sanitation, and his wife meets other farmers' wives and learns how to get around some of her problems. Some of the suspicion is being worn away by freer contact with people.

As real education in ways of living and in sane coöperation are being introduced, it seems to me that the present black eye of farm life, the infant and child mortality-rate, will soon lose its color, and that our figures will eventually show that life on the farm is *the* real life after all.

VACATION HEALTH PROBLEMS.

Dr. Adam S. MacKnight,
District Health Officer, State Department of Health, Southeastern District.

IT MIGHT at first thought appear that the subject applied to the state as a whole. Obviously, that would be impossible, the time limit forbids any such consideration even though vacation signs are in the air. We must, therefore, take up the problems and apply them to one of the eight health districts, namely, the Southeastern, as it is now designated by the State Department of Health.

For the information of those who may not have been aware of the fact that the health district lines have been changed by the Commissioner of Health, I would say that said district now comprises, and includes, all that section of southeastern Massachusetts, within the following lines, *i. e.*, beginning at Attleboro, thence across the state to Duxbury; along Cape Cod Bay to Provincetown; the Atlantic Ocean to Nantucket Sound (including the islands of Nantucket and Martha's Vineyard), across Vineyard Sound and Buzzards Bay to the Rhode Island state line, ending at Attleboro, representing roughly three hundred and fifty miles, more or less. Five-sixths of this boundary line is ocean, bay, or sound, and the remaining one-sixth land boundary.

When these boundaries were being considered by the Commissioner of Health, and transportation and other facilities taken up by the district health officers, several of my colleagues suggested a high-powered automobile; another an aëroplane, but the bright-

est *star* in the *galaxy* was nearer right when he advised a sea-plane.

As to area, this district totals about 1,574 square miles; it includes four cities and forty-eight towns, with a population of about 375,000. The district covers three entire counties, and cuts a big swath in two other counties. No other district can show, to vacationists, what this district offers to those in search of the Goddess of Health. It is a veritable Vacation Paradise for health seekers and well deserves that appellation.

This district meets the various individual health problems on a natural therapeutic basis. It has all the elements necessary to treat all those suffering from the ills of life, the stress of work and business, and it may restore broken-down "sports."

Nature has been wonderfully generous herself. She has, in this district, given us woods, meadows, plains, and hills; rivers, lakes, ponds, and creeks; ocean, shores, and beaches; islands, sounds, bays, harbors, and capes; boats, launches, sailing and fishing vessels; yachts, tugs, and barges; life-saving stations and lighthouses; railroads, automobiles, and the old-time stages; hotels, boarding houses, and cottages galore; shell fish, fresh water, and deep sea fishing; Cape natives, and real Indians; movies, and various other tonic forms of entertainment.

To show that this district is able to care for its own people's health problems, let me state that the four cities, at the head of this district, with a population of 267,000 people, average about 2,000 people to the square mile. In the remaining forty-eight towns the average is about fifty-nine people to the square mile, and in a few towns it is still less, *e. g.*, in West Tisbury the proportion is fourteen people to the square mile.

Surely, then, in the event of outbreaks of communicable diseases, anywhere, during vacation periods, it is still possible for vacationists to escape contact, in the pursuit of health and happiness.

In the forty-eight towns of the district with their fixed normal population of about 108,000 people, it is estimated, according to local authority computation, that the district really entertains an additional 300,000 people during vacation seasons. Take, for example, Oak Bluffs, for recent years, the population has increased to 18, 20, and 22,000 people during July and August. Other towns show an almost equal increase during said months.

There are various other factors affecting public health, which we would like to touch upon at length, such as public water supply, sewage disposal, bathing, beach and certain soil conditions, which materially affect the health problems of this district, but for lack of time these cannot be taken up now.

As to occupations: Outside of the cities mentioned, and perhaps a few of the towns, it may be said that sea and shore fisheries, cranberry culture, with certain agricultural productions, constitute the main occupation. There is still another and very important one, *i. e.*, the entertainment of summer visitors, young and old, rich and poor, sick and well. This occupation is re-

garded as materially profitable, and as a result the banks, hotels, boarding houses, and general business interests prosper. Taxes are paid, mortgages lifted, and property in general kept in good order.

As it has been said that the entertainment of summer visitors constitutes the *chief* occupation during half of each year, in support thereof I would like to quote the answer of one of the natives, at a session of the local court, who, when asked "What do you people do for a living?" replied," Well! half of the year we skin the summer visitors, and the rest of the year we skin one another, the doctor excepted." However this may be, there are two other important occupations, namely, farming and navigation, the latter by no means the least.

It is a remarkable fact, not generally known, that the vacationists come from all parts of this country, north, east, south and west. Even the Canadian Provinces, as far northwest as Manitoba, Saskatchewan, and British Columbia, send their quota. They also come from Europe, Australia, and India. This year, on account of the war and the advice of the Washington authorities as to passports, etc., numbers of people will seek this favored resort. On the other hand, on account of the money stringency, *i. e.*, lessened dividends, shrunken stock, and other business depressions, the people who might have gone to the Panama Exposition will content themselves on the Cape, and still further add to the seasonal quota, large as it is.

It is almost needless to remark that vacations should be carefully and studiously planned long before the advent of the vacation season. Not only by families, but by individuals, in order that the greatest good to the greatest need shall obtain. Locations should be well chosen; expenses carefully estimated, and positively healthful places secured. Convenient transportation facilities should not be overlooked. I would suggest that anticipated vacation sites and locations should be thoroughly investigated by prospective vacationists, at other than vacation seasons, when Nature is not "smiling," Note the water supply, milk supply, and sanitaries. Inquire when the cottage was last occupied? by whom? for how long? were there any illnesses? if so, of what nature? Call on the board of health, the local physician; communicate with the district health officer. Find out all that is to be advisably known as to the peculiar health problems of that particular locality where it is proposed the vacation shall be spent. It will pay you to do it.

Communicable diseases follow us everywhere, up and down the length and breadth of any district. They may be encountered on the trains, railroad stations, steamboat landings, hotel gatherings, halls, schools, and churches, in fact, wherever human beings are found, singly, or in groups.

I would suggest that vacationists, as a class, wherever they go should, as a preventive measure, avail themselves of typhoid prophylactic inoculation; this is a positive measure of safety by way of preventing typhoid fever, which is chief among the vacation diseases.

Let me say in closing that the vacation health problems of the dis-

trict are not by any means as serious now as in past years. The public is better informed. Boards of health are waking up to their responsibilities. Physicians are more alive to the transmission of communicable disease, and methods concerned in their prevention. Last, but not least, this district has the promise of a Barnstable County Hospital for the care of communicable diseases, including tuberculosis. When this hospital shall have been established, other vexing vacation health problems will have been solved.

THE CONTINUING PROBLEM OF VACCINATION.

Dr. Samuel H. Durgin,
Past President, Massachusetts Association of Boards of Health.

THE annual application to the legislature of Massachusetts for the repeal of its vaccination laws, and the frequent demand upon our busy professional men to defend said laws for the last twenty-five years, are well known. The members of this association need no argument from me to convince them of the wisdom of those laws or the necessity for their enforcement. The association is also aware of the many unfounded claims and charges made against vaccination by the agitators who make these annual appeals to the legislature. One of their claims is that vaccination does not protect. Another is that it is a dangerous procedure and produces other diseases in the vaccinated person. The first claim is contrary to the scientific and practical experience of the civilized world. The second is not only as weak as the first, but is presented to the committees by such evidence as exhibiting sick children and invalids to the committees and charging such illness and injury to vaccination, without sufficient evidence to establish a connection. This claim of injury from vaccination deserves our particular attention as a public health organization.

Massachusetts formerly had an excellent vaccination law, and, although it suffered a mutilation a few years ago at the behest of anti-vaccination agitators, there is enough of it left to warrant our respect and defence. Massachusetts also produces and furnishes free to all of her people a pure, safe and effective vaccine lymph, so that there is no longer any more excuse for accident or injury from its use than in any other of the minor and simple surgical operations.

Under these circumstances it seems to me that the state is in duty bound to extend her beneficent efforts in provisions for the protection of her people against contagious diseases by definitely ascertaining whether or not her people are really suffering the imposition and injury charged by those who are opposed to vaccination. This may be by a provision of law requiring that all cases of supposed

injury from vaccination within the state be reported forthwith to the State Health Department for immediate investigation and record. I would continue this work for a period of three or five years to secure the facts necessary to establish the truth or falsity of the charges made by the opponents of vaccination. In this way the most reliable facts may be secured for the future guidance of the people and the state. If the facts are against vaccination it should be abandoned. If otherwise, the facts will show the wisdom of the law and its enforcement, protect the good name of the state's vaccine product, promote the confidence and welfare of the people and check up some of the mistaken ideas about vaccination. To this end I desire to present the following resolution:

Resolved, That in the opinion of the Massachusetts Association of Boards of Health legislation should be secured by which all cases of supposed illness or injury from vaccination within the state of Massachusetts shall be forthwith reported to the State Health Department for immediate scientific investigation and record, and continued for a sufficient period of time to secure the facts to show conclusively whether or not any ill effects ever follow as a result of a clean vaccination with proper lymph and properly cared for.

I should be glad to hear an expression of opinion from members of the association, and, if favorable action is taken, I should offer a motion for a committee to take the matter in hand.

The resolution proposed by Doctor Durgin was seconded and unanimously adopted. It was moved and seconded that a committee be appointed by the chair to take such action concerning the resolution as might be deemed advisable.

THE CONTROL OF CANCER.

Dr. Edward Reynolds,
Vice-President, American Society for the Control of Cancer.

I APPRECIATE the opportunity of speaking to so representative a gathering as this on the subject that interests me particularly, and will try to go straight to the heart of the subject of cancer as a preventable disease, and a disease which has the largest mortality of any disease of adult life. Infant mortality and the mortality of tuberculosis at all ages, and during epidemics the mortality of some of the contagious diseases, are larger, but as a steady diet cancer kills more adults than any other disease. Of those who attain the age of forty, one individual in every eleven dies of cancer—one woman in every eight, one man in every fourteen. It brings it pretty close home. How many in this room will die of cancer if nothing is done about it? It kills 75,000 individuals in the United States alone in a year.

The executive council of the Ameri-

can Society for the Control of Cancer, a body which contains in its membership between twenty-five and thirty surgeons and pathologists of eminence gathered from all over the country, has debated carefully the percentage of cancer deaths that are preventable, and agrees that while no such gain can be expected immediately, yet under ideal conditions of education, if all the laity knew all that the laity ought to know of cancer, if all the medical profession were educated to the latest knowledge, 60,000 of those 75,000 deaths should be preventable. As Professor Winslow has lately said, we shudder at the needless waste of life in Europe today. Such needless waste of life as that I speak of Professor Winslow stigmatizes as senseless and unnecessary as that of war. The work of the most progressive states and communities shows that already a large proportion of boards of health are feeling that the chronic diseases are as much within their field as the contagious diseases, which at first made so large a proportion of their work. For instance, in Kentucky, Virginia, Louisiana, West Virginia, Michigan, Nebraska, New York, North Carolina, Kansas, in the city boards of New York, Rochester and other cities, and in the state of New Hampshire, close at home, the boards have already taken up the education of the public on the subject of cancer. It seems as though so important a matter of public education should fall within the activities of the local health authorities.

The great obstacle in the cancer campaign has long been the belief that the disease is uncontrollable. Such is not the fact today, and certainly health officers should be among the first to realize the latest knowledge. Our recent knowledge of cancer revolutionizes our ideas of its natural history to a very large extent, in two important particulars especially: first, cancer is at first a localized disease and becomes generalized only later. It is much like an epidemic of measles, let us say, in a city. While there is one case of measles in the city its isolation and the disinfection of its surroundings is easy and does away with an epidemic. If the population of the city flock in and out of that house from distant quarters, shortly there are isolated, scattered centers of measles all over the city, and the epidemic is uncontrollable. That is just the situation with cancer in the human body. While it is in one spot the isolation and disinfection of that one spot does away with the disease; when it has become generalized the disease is uncontrollable.

Not long ago the medical profession taught the diagnosis of cancer only after it was an uncontrollable disease; today we teach the diagnosis of cancer in its localized and controllable stages. Perhaps the foundation principle of our newer knowledge is in the fact that there is no sharp line between the benign and the malignant; that, on the contrary, the malignant diseases which we speak of collectively under the popular term of cancer ordinarily originate in benign tumors or in benign ulcers or irritations. Any persistent lump, ulceration or irrita-

tion should be considered so far potentially malignant as to demand serious consideration and careful diagnosis.

In the amount of time at one's disposal here it is impossible to go into the diagnosis of the several varieties of cancer in the many localities in which it appears. I have with me a certain—I am sorry to say rather limited—supply of pamphlets which tell what the American Society for the Control of Cancer is doing, and of pamphlets which tell what everyone should know about the disease of cancer and its diagnosis.

I want to say a word myself of the American Society. Beginning two years ago in New York, it has been endorsed by every one of the great professional bodies, and with its motto of "Opposition to none, Coördination and Coöperation with all," it is today working in coördination with all the other societies against cancer in the United States. Its objects are two. It does not conflict with the research bodies, but purposes to help them in coördinating statistically the results which they obtain, to follow statistical investigations into the origin, source, and method of communication of cancer, which so far has never been done on a large scale; and finally to publish to the laity the assured practical facts which we have with regard to the ease with which most cancers can be diagnosed in the early stages, and with which almost all can be controlled by trifling, non-mutilating operations if taken in the localized stage. We think that along both those lines health officers should be ready to coöperate. Many are doing that already; we wish all of them to do it. In the line of statistical research we hope that they will coöperate by seeing that the mortality reports are complete, that forms, which are uniform with those which have been adopted by the federal government at our suggestions and after preparation by high statistical authorities, are put into use as rapidly as practicable, since the value of such reports for statistical investigation depends entirely on their uniformity. We hope that they will aid in popular education, as no one can do better by the dissemination through their communities of printed information upon what every member of the laity should know about cancer in carefully considered form, either in your own bulletins or in the form of leaflets. We are prepared to coöperate with them in both directions, by furnishing them with copies of the approved forms for statistical reports and with material for publication to the laity in forms which have been carefully and authoritatively prepared. We will send for distribution, so far as our income permits, leaflets already printed for distribution, but we are prepared to furnish to any extent the material for publication for the press to anyone who will aid us in disseminating it. We are further prepared to furnish lecturers to any community which will furnish the audience, and we especially wish to impress upon health officers the value to the community that can be obtained by giving the nurses under their direction some education on this subject. Remember

that your nurses in their hospital training have seen the disease only in its late and incurable form. Remember than as they go about among the population, if they can have the information of how to prevent the disease, they can do more than anybody else to cut down its tremendous mortality, and worse than its mortality, its incalculable suffering, to somewhere near the ideal to which it should be cut down.

SOME PROBLEMS OF THE HEALTH OFFICER OF A SMALL CITY.

Francis George Curtis, M. D.,
Chairman, Newton Board of Health.

THE work of the health officer of a small city lies midway between that of the man in a large city on the one hand and of the country health officer on the other; he has his congested areas, differing only in degree from those of an urban community and his sparsely settled districts which closely resemble the farming districts of the country, and as a result he has the problems of both to solve.

He must, therefore, be an all-round man and the rules under which he works must be more or less elastic and fitted to cope with very different conditions, a fact which he must always remember when dealing with the various questions which arise in his work.

Then, too, owing to the fact that he is usually short handed and lacks the assistance of the various divisions upon which the urban health officer can rely, he must be prepared to act in many different capacities and yet, in spite of this his community expects his work to compare favorably with that of urban departments which are highly specialized.

He is supposed to be an authority upon every subject which bears, no matter how remotely, upon public health and to be able to give the public information upon matters such as the best means of ridding a house of fleas or bedbugs, whether the city water will cause rheumatism, or whether Johnny is liable to catch scarlet fever if he walks by a house in which there is a case of that disease.

When we consider further that the average surburban health officer has, up to the present time, usually had little or no training in public health work when appointed and has been compelled to learn his profession while he is practicing it, and further that he is seldom adequately paid for his services, we can understand that his lot is by no means an easy one.

It would be almost impossible, in a paper of this length, to consider all the questions which present themselves to the health officer for solution, and I shall not attempt to refer to more than two which seem to me of importance, and try to indicate what may be done to solve them.

One of these may not be, strictly

speaking, a health problem, but it is none the less very real and may be the cause of much trouble, and this is the question of the annual appropriation; of obtaining enough money to run the department properly.

For some reason best known to themselves, although it is often unintelligible to the board of health, the aldermen who hold the purse strings are very prone to believe that a health department can be run chiefly on air with a small intermingling of money, and to feel that when it is necessary to economize, the health department is a good place to begin. As a consequence of this, the estimates for the maintenance of the health department are frequently so cut and pared down that, when they finally emerge, they are almost unrecognizable to the men who made them up. It would seem to be almost an axiom that the men who are familiar with the work know more nearly the cost of doing it than men who know little or nothing about it, but for some reason this does not seem to be accepted.

In spite of this policy, the health department is held responsible for the care and well-being of a community of from 35,000 to 40,000 people and is frequently severely criticised if it fails to make every dollar do the work of two.

To the honor of the men who hold positions as members of boards of health and health officers, it can be said that they cheerfully accept the responsibility and seldom fail to make a creditable record.

The solution of this question is a difficult one, for if the department does well with a mutilated appropriation one year, it is very difficult to persuade the city fathers that more in proportion should be granted for another year, while on the other hand, if the department fails to keep within the limits of the appropriation, it may be severely criticised.

The health officer must impress upon his community that money spent in preserving the public health is money well invested, that disease—preventable disease—is uneconomic. It does not pay, in any sense of the word, to have an outbreak of disease in a community for, in addition to the actual outlay entailed by caring for the sick, there is a further loss due to the upsetting of normal conditions and to the curtailment of the productive power of those who are ill. The best insurance against this loss is an adequate appropriation for the health department and an efficient health officer to oversee the expenditure.

It is an encouraging fact that some communities are beginning to realize the truth of the old saying that "Health is wealth," and to understand that a clean bill of health is a valuable asset, and that the city or town which establishes a reputation for taking care of the health of its citizens, and lives up to it by showing a decreased morbidity, has a distinct advantage over its less careful neighbor. When this fact is more clearly understood, it will be easier to obtain proper appropriations for the health department, and the health officer can do much to bring about the desired end by showing his community results due to efficient work.

Above all a determined effort should be made to keep within the annual appropriation, but if this is impossible, as it often is, the health officer must be able to show that the overdraft was due to some unforeseen emergency and not to carelessness in handling the appropriation. For this reason a careful account of the annual expenditure should be kept by the department, so that the health officer may be able to justify his outlay.

In making the annual report a clear statement of the different objects for which the money has been spent should be given. It is not necessary to put down each separate bill in this statement, it being sufficient to classify them under the various headings. The statement of expense is valuable, as it enables the taxpayers to know for what objects their money has been spent.

The other problem which we are to consider, viz.: the prevention and care of communicable disease, is of course more strictly a public health matter, and has been chosen because so many of the functions of a board of health have a bearing upon it either directly or indirectly.

In this also there is a marked difference between a large and a small city, for in the latter the health officer has a more personal acquaintance with conditions in his community than he can have in the former. This is true from the very nature of things, for the man with 35,000 or 40,000 people under his care must have a more personal knowledge of matters pertaining to them than the man who has the care of 75,000 or 100,000. I believe that this personal familiarity has a great bearing upon the matter, and often helps the health officer in carrying out his work successfully.

In handling an outbreak of communicable disease the family physician constitutes what may be called the first line of defence; it is he who usually sees the case first and much may depend upon the promptness and correctness of his report and it should be made easy for him to report his cases.

It is a good plan for the health officer to make himself familiar with the practicing physicians of his community and know all he can about them so that he can tell who will help and who antagonize him.

He should join the local medical club, if there is one, and take an active part in its work, so that he can put before its members the point of view of the public health man, a point of view very different from that of the practicing physician and one of which the latter is often woefully ignorant.

It is really surprising to see how helpless a man, who has been in active practice for a quarter of a century or more, may be when he discovers a case of a disease dangerous to the public health in his practice, and how absolutely incapable he may be of understanding the point of view of the health officer.

If a physician neglects to report a case of a disease dangerous to the public health promptly, I believe it is more often due to this ignorance or to carelessness than it is to intent or a desire to conceal the case, and more can be accomplished by a personal note

calling attention to the neglect than by haling the offender into court. Here, again, the personal knowledge which the health officer of a small city can have of the physicians in his community will help him to decide what course to follow.

It is not necessary to tell this audience of the steps to be taken to prevent an outbreak of disease nor of the various methods of checking it, when once it has started, but there is one point to which I wish to draw your attention; that is the great lack of uniformity in the methods of control which obtain in different communities. These differences are very marked and tend to cause the public to wonder whether the men in public health work really know what they are doing and why they do it.

Take for example the following questions: The treatment of the adult well members of the family in which there is a case of communicable disease; the attendance at school of immune children during the continuance of the disease; the closure of the schools as a means of checking an outbreak and the value of terminal room disinfection as ordinarily carried out by a board of health. Each of these questions is of great practical importance, and yet every one knows what a wide divergence of opinion there is in regard to them even among boards of health.

While it is true that these questions are fully as important to the urban as to the suburban health officer, yet I believe that they are brought home more closely to the latter because of that same more intimate association, to which I have already referred, which he has with the men of his community.

The men with whom he comes in daily contract ask him, "Why?" They are from Missouri and want to be shown, and he must be able to answer their questions intelligently and convincingly. If he can convince them that he is right, they will work with him and help him; if he cannot convince them they will oppose him, if not actively at least passively, and his work will be harder.

One great difficulty which a health officer encounters in his work is the combating of peculiar ideas in regard to communicable disease which persons have learned from their family doctor and, because he is the trusted family doctor, they believe what he says and are inclined to disbelieve the health officer.

It will not do for the health officer to say that he personally believes that his course in these matters is the right one, especially if the communities surrounding him do differently; he must have some authority to which he can refer. If he is right, the opposite practice in his neighbor city weakens him unless he can show that his neighbor is in error.

It is for these and similar reasons that I believe that there should be some definite course of procedure adopted upon these questions. I do not mean that iron-clad rules should be laid down which would prevent independent action and check progress but rules could be adopted to which the

health officer could refer as his authority, showing what the best practice at the present time advises.

It seems to me that this association, made up as it is of men in all branches of the service, state, urban, suburban and rural, is admirably fitted to do this work and I hope that in this, the twenty-fifth year of its existence, it may see fit to do so.

INFANT MORTALITY FROM THE STANDPOINT OF THE STATE.

Dr. William Hall Coon,
District Health Officer, State Department of Health, Northeastern District.

IN PRESENTING the problem of infant mortality in this Commonwealth I shall forego the temptation to compare the situation as it exists, with calamities and disasters attended by great loss of life, and only present to you the facts as they appear —facts so significant as they stand that they need but little comment other than that they express conditions not at first easily grasped because seemingly possible.

These then are the facts, that during the years 1903–12 108,000 babies died in Massachusetts; that in 1912 (the last year for which registration statistics are available) for every 1,000 babies born 116 failed to live through the first year of life; and that in the same year 20 per cent. of all deaths were among infants under one year old.

It is rather startling to know that over 10,000 babies die each year in Massachusetts, but these facts assume further importance when the deaths among infants are compared with the deaths from certain other causes. In 1912, again, the mortality from typhoid fever had been so reduced that but 5 out of each 1,000 deaths were due to this disease; diphtheria was responsible for but 8 out of each 1,000 deaths; tuberculosis of the pulmonary form caused 80 out of each 1,000 deaths; while infant mortality, if I may use the term here, was responsible for 200 out of each 1,000 deaths registered.

In other words infant mortality was responsible for forty times as many deaths as typhoid; for thirty-seven times as many deaths as were caused by diphtheria, and for two and one-half times as many deaths as were caused by pulmonary tuberculosis.

These statements, I trust, will serve to show the importance of the problem of infant mortality in this state, even as they express the relative unimportance of two of the communicable diseases, relatively unimportant as far as these diseases are at the present time factors in the destruction of human life. As a matter of fact the situation is this, that in 1912 the combined deaths from tuberculosis, typhoid, diphtheria, measles, scarlet fever and smallpox were but half those from infant mortality.

The low death-rates from the diseases just mentioned are to the credit

of those agencies responsible for their being so. Just how much lower they may be brought I am not sure, but it is my conviction that, however much the state may do, we have come to that point where a further reduction in the death-rate from the diseases named will be much more gradual and that no abrupt decrease may be looked for. The knowledge gained concerning the modes and dangers of infection have pointed out the way to methods of prevention until we have now but to apply these methods to hold the ground already gained.

But while state medicine has concerned itself in decreasing the mortality from certain of the communicable diseases, other conditions attended by a high death-rate have received but little or no attention. Among these conditions are those responsible for infant mortality. These conditions, to be sure, have but little relation to general medicine but they have a very distinct relation to preventive medicine for it is by overcoming these conditions that lives are to be saved and it is quite as important, it seems to me, to prevent a death in infancy as to prevent infection in adult life.

While the state as a whole has not, up to this time, concerned itself in the problem of infant mortality, some of the cities have taken up the work and have set an example to the state as to what may be accomplished through proper effort. Boston, through its board of health and the Milk and Baby Hygiene Association, has succeeded in reducing its infant mortality from 133 deaths per 1,000 births in the period 1906–10, to 103 in 1914. Holyoke has done excellent work and is, as far as I am aware, the only city in the Commonwealth in which an annual appropriation is made by the municipality for infant hygiene work. If I do not mention here other communities which are also doing infant hygiene work, it is because I have not had the time to make full inquiry into the subject.

In considering the subject of this paper I have been much interested in reading the report for 1914 of the society in New Zealand for the health of women and children. New Zealand, you know, has the lowest infant mortality rate in the world, 51 per 1,000, a very low rate, indeed. Here the work is carried on by a private organization subsidized by the government. The New Zealand authorities were asked if this very low rate of 51 per 1,000 was not due to some exceptional conditions associated with the islands. The authorities answered that it was not due to the climate for the climate was much the same as in other localities outside of New Zealand where higher rates prevailed. That it was not due to the milk supply for that was not remarkably good, and that it was not due to sanitation for the sanitation of New Zealand cities was no better than in other cities showing higher rates. The reason, and the sole reason given for the low mortality rate, was special and practical education by nurses trained for the work.

These nurses, twenty-seven in number, serve a population of approximately 450,000 distributed among twenty towns. Their work is to advise the mother previous to the

birth of her child, and many mothers apply for such service; to advise the mother in the care of the child after birth, and to follow up this advice by other visits during the first year to see that the instructions given are carried out and that the child continues well. The stated object of this society may well be considered in the prevention of infant mortality. To quote, "The society is less concerned in reducing the death-rate than in improving the health of the people. As a health society we are more interested in firmly establishing the all-around fitness of the 25,000 annual new arrivals who will live than we are in reducing the potential deaths from 2,000 to 1,000. However, the problems are intimately related since the simple hygienic measures which tend to prevent death in babyhood are also the measures which lay the foundations of strong healthy minds in sound enduring bodies."

The problem in Massachusetts is in no wise different from the problem in New Zealand. What has been done there can be done in our own Commonwealth. Nor is there much difference in opinion as to how this work may be best carried out, although it should ever be borne in mind that this work of saving babies, while one of the simplest and most direct parts of preventive medicine, is work that should be carefully planned and so supervised that it will always be not simply work directed toward the prevention of infant mortality, but work directed toward keeping well babies well, for upon this result will the success of the work be measured.

As the problem is state wide such a supervision as that just mentioned should be exercised by the central health authority of the state and from this authority should be directed the educational and publicity work necessary to the campaign.

In the field the work should be where it belongs, in the hands of public health nurses, nurses specially trained for their duties. There can be no question but that such a system as the one just outlined would result in a very short time in a material reduction in the death-rate, not only among infants but among children of all ages.

Ten thousand babies die each year in Massachusetts. It is high time that we gave to this fact the consideration it deserves.

REPORT OF THE COMMITTEE ON VENEREAL DISEASES.

The Committee on Venereal Diseases, appointed by the Massachusetts Association of Boards of Health at the January meeting, met last Wednesday in the office of the Boston Board of Health and drew up the following resolutions to present to this society:

First: That syphilis and gonorrhea be made reportable diseases.

Second: That a Wassermann laboratory be established by the State Department of Health to which Wassermann workers in health departments may go for instruction that technique may be uniform and that the establishment of laboratories throughout the state may be encouraged.

Third: That the Legislative Committee of the

Massachusetts Association of Boards of Health be instructed to draw up a bill with the coöperation of the State Department of Health, the Massachusetts Medical Society and the Homeopathic Medical Society, requiring that all information and all reports, in connection with persons suffering from these diseases, shall be regarded as absolutely confidential and shall not be accessible by the public, nor shall such records be deemed public records.

Fourth: That inquiry cards be sent to the boards of health of each city and to the physicians of towns requesting a report on the number of cases of venereal diseases under the care of physicians.

Fifth: That an appropriation of one hundred and fifty dollars ($150) be requested for the above items.

This money appropriation was asked of the society by this committee for the purpose of establishing a state-wide campaign on this venereal problem, this money to be used by the committee in obtaining all information possible as to the amount of venereal disease in the Commonwealth; and to urge upon various municipalities whose boards of health have members in this association, to start the full diagnosis of both syphilis and gonorrhea; and, furthermore, to urge upon the hospitals the importance of treating these cases. Most of them now are refused admission in hospitals. This committee regard it as essential that these diseases be made reportable diseases either by name or by number, but there must be legislative action to make these private records, or else the work will probably be partly nullified.

This committee consisted of Doctor Mahoney of the Boston Board of Health Department; Doctor Curtis of Newton; Doctor Palmer of Framingham; Doctor Kennedy of New Bedford, and myself. All were present at this meeting at which these resolutions were adopted, with the exception of Doctor Kennedy. And, furthermore, at our invitation the health department of the state sent Doctor Hanson as their representative to this meeting. There was absolute unanimity in the committee on these resolutions.

FREDERICK H. BAKER, M. D.,
Chairman.

It was moved that the report of the committee be accepted as a progress report and referred to the Executive Committee with power to act.

THE PRESIDENT: We would be remiss in closing this very profitable and interesting day if some word were not said in appreciation of that person who was the inspiration of these meetings and their guiding spirit, namely, Prof. George C. Whipple, who, though he has modestly kept in the background, has borne the burden and the heat of the day in attending to the many details necessary to prepare the program, and to rent the hall, and to cook the dinner, and what not.

On motion the association adjourned.

Book Reviews.

A Manual o Personal Hygiene: Proper Living upon a Physiologic Basis. *By American Authors. Edited by Walter L. Pyle, M. D., Philadelphia. Sixth Edition, Revised and Enlarged. 12 mo. of 543 pages, 138 illustrations. Philadelphia and London: W. B. Saunders Company, 1915. Cloth, $1.50 Net.*

Previous editions of this important book have been reviewed in this JOURNAL. Each revision has served to make it a more inclusive and better proportioned work. The contributors are men of high standing and speak with clearness, good sense, and authority. The editor himself writes of the eye in a valuable chapter that no longer appears unduly extended in proportion to the other sections as it used to do. Doctor Courtney's treatment of the hygiene of the nervous system is admirable; so is Doctor Goldthwait's discussion of posture.

The chapter on Food—Adulteration and Deterioration, by Doctor Wiley, was introduced in the Fifth Edition. The writer might have distinguished more carefully between food which is injurious and that which is merely fraudulent. A new chapter on the Hygiene of Infancy follows that on Food. It is a useful section and it is not likely that any harm will result from a ludicrous mistake on page 460: "for each occupant of the room there should be from 500 to 1000 cc. of air-space." What if they all inhaled at once? A manual of personal hygiene necessarily consists pretty largely of truisms; every intelligent man knows more health principles than he has time to practice. But it is none the less desirable to have books like this one, for the reader is able to find, in the midst of so much that is familiar, the really helpful and novel suggestions that he can take to heart.

Percy G. Stiles.

Health Department Reports and Notes.

REPORTS

Springfield, Massachusetts.

The report of the Springfield Board of Health for the year 1914 is brief and interesting. In Springfield a city hospital is maintained as a part of the department of health. This hospital and the medical inspection of school children while maintained by the health department are conducted under separate appropriations. Together, they received more than twice as much as the department received for its regular work. The appropriation for real true public health work amounts to about 17 cents per capita—which is surely not high in view of a total death-rate of 14.49. In Springfield, as indeed in most every city, an increasing interest in the obtaining of a safe milk supply has been evident. It does not appear from the report whether the tuberculin test is employed in the dairies supplying Springfield. The infant mortality-rate for Springfield is 96.8, having been reduced from 100 the previous year and from the efforts which are being made it seems not unlikely that it may be further reduced.

Harrisburg, Pennsylvania.

A large portion of this report is given to an explanation of the reorganization of the health department which was effected during the year 1914 and to a discussion of the things the department has done in the past year and what it hopes to do in the coming year. The only difficulty with this sort of a report is that members of the city council to whom it is addressed are not likely to read it, or if they do, will not be as ready in appreciating the points which ought to be emphasized or would be desirable. The outside back cover page of this report shows a number of interesting facts about Harrisburg such as population, wealth, public improvements and the like. One page of the report is given to the comparison of death-rates of various Pennsylvania cities. This shows Harrisburg ranking third with a rate of 13.9 while the largest cities of the state, Philadelphia and Pittsburgh, are given as 15.7 and 17.01 respectively.

Louisville, Kentucky.

The report of the Louisville Health Department shows that in this city of 250,000 a progressive and aggressive department is accomplishing a great deal in its efforts to protect the health of the city.

That part of the report dealing with the control of the milk business indicates that this division is maintaining a very useful service. It is to be noted with some regret, however, that the flash method of pasteurization is still recognized as alternative with the, now much more generally favored, holding method.

The vital statistics are in the latter part of the report and are not so extensive or detailed as to burden the report with a vast mass of figures which will never be looked at.

Large plain print in the body of the report, together with distinctive headings for various topics discussed, make it easily readable and attractive. A number of short but telling statements like the following indicate that the health officer appreciates in a broad and enlightened fashion the modern problems of public health:

"Tenement House Inspection Does Not Solve Housing Problem."

"Another year has passed and we still have no fly ordinance."

"Notwithstanding the heavy burden now placed on the two visiting school nurses, they are doing excellent work and getting good results."

NOTES.

A Score Card for Privies on Dairy Farms.—Each dairy farm inspector of the District of Columbia is now required to fill out in duplicate a score card of the kind shown below for each farm inspected. One copy is attached to the regular dairy farm score card and is left with the dairy farmer; the other copy is sent in to the health office with the duplicate of the dairy farm score card. In the office it becomes a part of the record of the dairy farm to which it relates. The use of this special score card for privies on dairy farms is temporary, the plan being to incorporate a score for privies in the next edition of the regular dairy farm score card. As there are now more than twelve hundred dairy farms shipping milk into the District of Columbia, the educational work of the Department with respect to the sanitation of privies on dairy farms will be widespread, and it should have an influence on each immediate neighborhood in which a dairy farm is located.

HEALTH DEPARTMENT OF THE DISTRICT OF COLUMBIA.

DAIRY AND DAIRY FARM INSPECTION SERVICE

Score Card for Privies on Dairy Farms.

Dairy Farm No. Date

	Perfect	Allowed
1. Location	3	
2. Construction	3	
3. Cleanliness	2	
4. Disposal of Contents	2	
Total	10	

Remarks:

.....

(Inspector's initials)

INSTRUCTIONS TO INSPECTORS.

A privy to be scored perfectly should conform to the following:

Location:

At least 100 yards from any source of water supply, dairy, and dairy barn.

On ground the slope of which is away from the source of water supply.

Construction:

Floor in front of the receptacle should be made of some non-absorbent material, above the surface of the surrounding ground, and incline toward the door.

Receptacle for filth should have adequate means of access for cleaning the receptacle and removing the filth therefrom, and be constructed of such material and in such manner as to prevent absorption of the filth or any escape of the filth by leakage.

Openings in seats should be provided with covers.

All openings should be effectually screened to prevent insects from gaining access to the filth, and the door should be provided with a weight or spring so as to keep it closed at all times.

Cleanliness:

All fecal matter and urine should be deposited in the receptacle provided for the purpose, and general rules for cleanliness applied.

Disposal of Contents:

All contents should be deodorized during their retention in the receptacle, should be removed before the receptacle is completely filled, and should be buried in dry earth upon removal.

A Method of Rating Milk Dealers.—The figures given below illustrate a rather unusual method of rating retail dairymen, which is used at Dayton, Ohio. This consists in combining the ratings on several items, quality, bacteria, content, and sediment and also on dairy and of milk plant inspection.

Every three months a list of dairymen is made up according to locality, the one with the highest grade being placed first and so on down the list.

The key is as follows:

QUALITY.

Good	25 points
Fair	20 points
Medium	12 points
Poor	5 points

BACTERIA.

Below 10,000	25 points
10,000 to 100,000	20 points
100,000 to 500,000	15 points
500,000 to 1,000,000	10 points
Above 1,000,000	0 points

SEDIMENT.

No sediment	25 points
Small amount	20 points
Medium amount	15 points
Considerable amount	10 points
Large amount	5 points

MILK PLANT AND DAIRY SCORES.

90 to 100%	25 points
80 to 90%	20 points
70 to 80%	15 points
60 to 70%	10 points
Below 60%	0 points

The following specific cases well illustrate the working of this plan.

PASTEURIZED MILK.

Name	Qual.	Bact.	Sed.	Milk Plant score	Total score
A	20	20	20	23	83
B	15	22	25	20	82
C	15	15	20	20	70

CERTIFIED MILK.

				Dairy score	
A	20	25	25	25	95
B	25	20	23	25	93
C	20	20	18	15	73

RIVERDALE.

Name	Qual.	Bact.	Sed.	Milk plant score	Dairy score	Total score
A	20	20	20	20		80
B	10	20	20	21		71
C	12	15	10		15	52

*

Alcohol and the Public Health.—Dr. S. S. Goldwater, New York city's commissioner of health, has replied to the critics of his announced campaign against alcoholic drink with a statement that seems eminently to justify his position. The duty of his department, he shows, is to guard the health of the people in every possible way. While it has the authority to promulgate certain rules to meet undesirable conditions and emergencies, interference with the drinking habits of the public would be beyond its powers. But it is entrusted with the task of educating the people concerning menaces to their welfare. Publicity regarding the dangers that lurk in adulterated and contaminated milk has prevented much sickness and saved many lives. Preaching the gospel of fresh air and cleanliness has exerted a like salutary effect. The crusade against drug using has greatly benefited the community. These are all recognized as proper subjects for the department's campaign of education. The evils resulting from alcoholic indulgence are equally conceded, and why, therefore, asks Doctor Goldwater, is it not the duty of the officials to lay these facts also before the people? A diminution in the consumption of alcohol, he says, would mean less tuberculosis, less poverty, less dependency, less pressure on hospitals, asylums and jails. Drinking mothers lose twice as many babies as do those who are sober. More alcoholism is found in the parents of feeble-minded children than in the parents of the normal. Alcohol "impairs memory, multiplies industrial accidents, causes chronic disease of the heart, liver, stomach and kidneys, increases the death-rate from pneumonia and lessens natural immunity to infectious diseases."

This indictment is founded on scientific fact. There are those who believe the day will come when health officials generally will combat the drink evil as vigorously as they are now attacking tuberculosis and other scourges of the human race.—*Pittsburgh Gazette-Times.*

Public Health Notes.

Pan-American Scientific Congress.—The Preliminary Program of the Second Pan-American Scientific Congress to be held in Washington, December 27 to January 8, has been issued by the Department of State. The meetings of the Congress will be held in the Pan-American Union. The meeting comes at this time and place in accordance with the resolution of the First Pan-American Scientific Congress which was held in Santiago, Chile, December 27, 1908, to January 5, 1909.

The members of the Congress include the three following classes:

I. The official delegates of the countries represented.

II. The representatives of the universities, societies and scientific bodies of the countries represented.

III. Such persons in the countries participating in the Congress as may be invited by the executive committee with the approval of the countries represented.

The Congress will be divided into the following sections:

1. Anthropology.
2. Astronomy, Meteorology and Seismology.
3. Conservation of Natural Resources, Agriculture, Irrigation and Forestry.
4. Education.
5. Engineering.
6. International Law, Public Law and Jurisprudence.
7. Mining and Metallurgy, Economic Geology, and Applied Chemistry.
8. Public Health and Medical Science.
9. Transportation, Commerce, Finance and Taxation.

General Gargas is chairman of the Section on Public Health and Medical Science. The program for this section is subdivided under the following main headings, each of which is again subdivided:

A. Public health, including infectious diseases, their modes of infection and their control; and nutritional diseases with their bearing upon public health.

B. Vital statistics including both birth and death registration and morbidity reports.

C. Sociological medicine. In this portion of the program will be included the various topics referring to the educational features of public health work.

D. Sanitation.

E. Conference on laboratory.

Dr. William C. Woodward, former president of the Association and health officer of the District of Columbia, has been appointed by President W. T. Sedgwick as the official delegate of the American Public Health Association to this Congress.

*

Educational Nursing.—The June issue of *The Nurse* contains an article outlining the work done by the Association for Improving the Condition of the Poor in New York City through the agency of the public health nurse. A great deal of importance is attached to prenatal work among mothers. If necessary the Bureau sends a visiting housewife to help with the heavy work, arrangements are made for the patient to be examined by the physician, and home or hospital care is planned.

Affiliated with the work of the Bureau of Educaton is the Caroline Rest Home for mothers and babies. This home is open all the year to mothers in poor physical condition and to those who need training in the care of their babies. The Rest is thoroughly equipped and care is taken that every detail of the patient's life there may be most helpful. If any child needs treatment for a minor illness he is taken by the mother to the clinic and there the mother may observe the treatment as it is administered. During the three summer months last year 217 babies were cared for. During the year 505 women, 578 babies and 567 children were given opportunity for rest at this Home.

*

Function of School Nurse.—The following table is of interest in showing the extent to which school nurses are employed in this country.

Division	Cities having systems of medical inspection	Cities employing school nurses	Number of nurses employed
North Atlantic.....	236	52	261
South Atlantic.....	23	5	11

South Central	35	4	5
North Central	109	28	114
Western	40	13	24
United States	443	102	415

Her work in general may be summarized as follows:

1. In the school:

(a) Making routine examinations of children to detect those cases which should be referred to the school physician.

(b) Assisting the physician in making physical examinations and recording results.

(c) Acting in emergency cases, such as caring for accidents, bandaging cuts, removing splinters, caring for cases of fainting, convulsions, and the like.

2. In the home:

(a) Explaining to parents the significance of the notices sent by the school physician concerning the condition of their children and aiding the parents in securing remedial action.

(b) Instructing and educating parents in the practices of applied hygiene.

3. In the clinic:

(a) Assisting the physicians in treatments and operations.

(b) Leading the children to view the proceedings of the clinic as diverting experiences rather than terrifying ordeals.

This work has had a most gratifying result in New York City where the number of exclusions from school have been reduced to something like one-thirtieth of their former proportions.—*The Modern Hospital*, June.

*

Carbon Bisulphide as Insecticide and Germicide.—According to an article appearing in the Wiener Klinische Wochenschrift, April 15, 1915:

"Carbon bisulphide has been used and has been found to meet all the requirements of a louse destroying agent. It is prepared by passing sulphur fumes over red hot coal. When fresh it has a disagreeable odor which it loses on distillation. To use it a large tin can is three-fourths filled with carbon bisulphide and 150 grams of paprika and 250 grams of flores sulphuris are added for every kilogram of carbon bisulphide. The clothes are hung up and the mixture is placed in tin trays and lighted. At the end of two hours, the lice as well as the eggs are destroyed. The residue remaining in the tin trays may be used as a deodorizing agent.

"The results obtained with carbon bisulphide as a remedy against lice have been so satisfactory that it was thought to be of value as a bactericide. Pieces of cloth soaked in boullion cultures of typhoid and cholera and later allowed to dry were exposed to the fumes and after two hours the bacteriological examination was negative. Pieces of cloth impregnated with bouillon cultures of the same organisms and placed in Petri dishes were exposed for the same length of time and the examination was again negative. Fresh virulent cultures of the organisms, in both open and closed reagent bottles, were likewise exposed and with a single exception (one tube of cholera bacilli) the subsequent examination was negative. Slant agar cultures were also killed in the same length of time. From these investigations it would appear that this agent acts not only against lice but also against pathogenic bacteria which may be present in clothes."—*New York Medical Journal.*

*

Starch Agar, a Useful Culture Medium.—Capt. E. B. Vedder has found the above medium preferable to the commonly used salt free veal agar for the growth of gonococci. A beef infusion is prepared as in making broth (meat extracts do not give good results). To this 1.5–1.75 per cent. of agar is added. No peptone or salt is used. The mixture is cooked, clarified and filtered as in preparing ordinary agar. It is then neutralized so that the final reaction will be from 0.2–0.5 per cent. acid to phenolphthalein. Ten grams of commercial corn starch are added for each liter of the medium. The corn starch is usually ground up with a little agar in a mortar to avoid lumps. After adding the corn starch the mixture is boiled for a few minutes, tubed and sterilized at not more than fifteen pounds pressure.

The medium is slightly clouded but is simple, inexpensive and has many other advantages. The growth of gonococcus organisms upon this medium is profuse after twenty-four hours and increases up to three or four days. These cultures are suitable for the culture of antigen and may be kept alive in the tube for over twenty

days. This medium may be melted and used for plating out cultures, and it is valuable for routine use with many other organisms.—*Jour. of Infectious Diseases*, May, 1915.

*

Syphilis in the American Negro.—Through the study of statistics as well as by means of their own investigations Lynch and McInnes reached the following conclusions concerning the above topic:

"1. That in the Southern United States syphilis in the negro is proven to be a serious problem, affecting probably from 50 to 60 per cent. of the major class of this people, including day laborers, servants and trades people.

"2. That the negro women are apparently more subject to the disease than the negro men.

"3. That there is no apparent suggestive relationship between the positive Wassermann reaction and high blood pressure in the negro.

"4. That the ravages of syphilis in the individual were not severe in this study, that the diagnosis of the disease is difficult to make in many of this class of cases without the aid of a specific test, and in respect to the Wassermann reaction, barring a few doubtful reactions and three or four negative reactions in suspicious cases, in our opinion this test proved of good value, verifying suspicions of the infection.

"5. That it seems that while one or two miscarriages occur not more frequently in the syphilitic than in the non-syphilitic, the habit of miscarrying is much stronger in the former.

"6. That syphilitic women are not as productive as the non-syphilitic, and their children do not survive as well as those of the latter."—*Southern Medical Journal*, June, 1915.

*

Organization and Activities of the International Health Commission.—The International Health Commission was created in June, 1913, by the Rockefeller Foundation and undertook as its immediate and principal task the relief and control of hookworm disease. Active measures are now in progress in the Southern States, Central America, the West Indies, British Guiana, and Egypt. The Sanitary Commission was organized by Mr. John D. Rockefeller in 1909 and was granted a million dollars to be used during the ensuing five years toward the eradication of hookworm disease in the United States. The necessary organization was carefully formed and work was undertaken in coöperation with the Board of Health in the states of Virginia, North Carolina, Georgia, South Carolina, Tennessee, Arkansas, Mississippi, Alabama, Louisiana, Kentucky and Texas. A state director was jointly appointed and the first work undertaken was to secure the coöperation of the physicians, the educational officers and the press. Thus the plan was put before the people in such a way that specimens for examinations could be readily obtained. First the state militia, then children of the various orphanages, then children in the public schools were examined. The disease was found to exist among from 10 to 90 per cent. of the people in various countries. The Dispensary plan was adopted and around this all activities centered. Before the close of 1914 there had been 1,273,850 persons microscopically examined, 694,516 persons were reported and treated, of this number 254,118 were treated and voluntarily reported by physicians, 440,398 were treated in the Dispensaries.

The next logical step was the extention and intensifying of the work in special communities. This has already been done to some extent. Other counties have agreed to coöperate in the work and the preliminary steps have been taken in the places previously mentioned. The Rockefeller Foundation supplies $400,000 for the work of the present year and it is expected that the amount will be gradually increased.—*Jour. American Med. Assoc.*, June 5, 1915.

*

Hygiene in the Field.—The Medizinische Klinik, Berlin, states that "among the various measures enforced or contemplated to keep troops in health, it is the plan to repeat the antityphoid inoculation after a five months' interval. Every tuberculosis suspect is sent home, and a careful search is made through the civilian population for consumptives and suspects, and they are isolated in the public hospitals if possible. When this cannot be done they are left in their homes; the homes are placarded and all intercourse with soldiers is prohibited."—*Jour Amer. Med. Assoc.*, June.

A Periodic Health Examination.—The following results of the examinations of employees of commercial houses, banks, etc., by the Life Extention Institute bears emphasis of the advisability of a periodic health survey as a part of the personal hygiene of every individual.

	Per cent.
Normal	3.14
Imperfect—Advice needed regarding physical condition or living habits	96.86
Not aware of impairment	96.69
Referred to physicians for treatment	59.00
CLASSIFICATION OF IMPAIRMENTS	
Moderate to Serious	
Organic heart disease	5.38
Arterio-sclerosis—thickened arteries	13.10
High or low blood pressure	25.81
Urinary—Albumin, sugar, casts	35.63
Individuals showing combined disturbance of circulation and kidneys	12.77
Nervous	.73
Lungs—possible tuberculosis	.99
Venereal	.46
Minor to Moderate	
Functional Circulatory—Rapid, slow or intermittent pulse	11.37
Urinary (high and low specific gravity, crystals, indican, etc.)	21.62
Digestive organs	6.12
Constipation	14.70
Nose and throat	34.53
Ears	16.96
Decayed teeth and infected gums	22.22
Anemia	2.72
Skin	6.38
Errors in diet (pronounced)	13.70
Errors in personal hygiene	31.60
Physical Defects	
Faulty vision, uncorrected	16.03
Flat foot	3.19
Faulty posture	7.38
Rupture—no truss	1.79
Overweight—important	5.45
Underweight—important	19.16
Unclassified	7.38

The above table shows the percentages that the various impairments are of the whole number of employees examined. Many employees, of course, show several combined impairments. Average age 30.

Such a survey, asserts Doctor Fiske of the Life Extention Institution, may be made by any well-trained, up-to-date general practitioner who has been fully instructed as to the lines along which to carry the examination. And it should be even more than a mere physical examination, covering an inquiry into the heredity and living habits. Even though the expert diagnostician may be unfavorably impressed with what he considers the "superficiality" of the examination and some other physicians remain uninterested in any case which does not present serious pathological problems, the value of such an examination to the average individual in suggesting correctives regarding modes of living should be great indeed.—*Modern Hospital*, May, 1915.

*

A New Contrast Stain for B. Diphtheriæ.—Dr. G. McF. Mood has perfected a method by which methylene blue is converted by oxidation into methylene red within polar granules of this bacillus during the process of staining. The stain as perfected is as follows:

"Sat. Alcoholic Sol. Methylene-blue (Koch for Bact.) 1 part.
Hydrogen peroxide 9 parts."

The stain may be kept in well-stoppered bottle for several weeks. Upon its application there occurs a rise of small gas bubbles and as soon as this ceases (30 seconds to three minutes) the specimen is sufficiently stained, and may be dried either in the air or with the application of a small amount of heat. The bodies of the bacteria stain a pale pigeon-egg blue, while the polar granules are bright red. The results obtained by using this stain in over 600 specimens have been found to check exactly with the Loeffler and Neisser stains. The contrast colors are easily seen especially when artificial light is employed; and specimens will not overstain even if left for a half hour. The stain is not applicable to smears taken directly from the throat as the granules fail to stain under these conditions. After about eight hours' incubation at 37.5° C. upon Loeffler blood serum mixture the granules begin to appear and organisms which have been incubated for sixteen or eighteen hours give the optimum staining reaction.—*Southern Medical Journal*, June.

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Recent Progress in Public Health Nursing.—A series of short articles in the *Public Health Nurse Quarterly*, April, 1915, present in brief form the work of four states in this line of public health activity. In New York the public health law was amended in 1913 to provide for a Division of Public Health Nursing in the State Department of Health. Nurses are required to pass civil service examinations, each nurse must

be not less than 25 years of age, and a registered nurse in New York state, and must have had at least two years' experience after graduation. As soon as a civil service examination was held the full quota of eight supervising nurses were appointed. The outline of the years work indicates the duties of the division which may be summarized as follows:

"To advise with local public health nurses in times of epidemic and to assist in the control of such epidemics.

"To advise and coöperate with school nurses, visiting nurse associations, social welfare centers, and in other fields in the relief and prevention of disease.

"To maintain constant supervision over the midwives of the state outside the cities of New York and Rochester, which are exempt.

"To extend the number of infant welfare stations and to advise and coöperate with the authorities in charge of already existing stations.

"To follow up patients discharged from county tuberculosis hospitals.

"To make tuberculosis surveys in counties where no hospital exists and to advise and coöperate with those administering tuberculosis dispensaries, and to urge the employment of a follow-up nurse by county tuberculosis hospitals."

In 1913 Ohio passed a law empowering medical superintendence of county or district tuberculosis hospitals to appoint public health nurses. In case a county had not provided such a hospital the county commissioners were allowed to appoint a public health nurse and pay her salary and necessary traveling expenses out of the poor fund. Of course, many public health nurses had been appointed by local boards of health previous to this act. So that there are now forty-two county, district and municipal nurses reporting their work each month to the State Board of Health.

In Massachusetts no division of public health nursing has as yet been planned by the State Department of Health and the question of its immediate inauguration depends almost entirely upon appropriations available. The value of this work is not doubted, however, and such a department will ultimately be established. At present fifteen cities and towns are on record as maintaining a public health visiting nurse in connection with their tuberculosis work.

Particular interest attaches itself to this work in Wisconsin because this is a rural state. Here the activities of the visiting nurse reach the remote farm house and the little country school.

As early as 1910 the Wisconsin Anti-Tuberculosis Association offered as one of the Red Cross Christmas seal prizes the one month services of a visiting nurse to each of the twelve cities between 8,000 and 25,000 population making the highest per capita sales. The work became popular at once. At present a graduate trained nurse is in the employ of the Association and visits communities which have manifested a desire to try out such work where she spends several weeks in putting the plan into actual operation.

In 1912 the state legislature passed a bill enabling counties to employ a visiting nurse who should care for patients both in the towns and in the country districts. Wisconsin has found that the people of the country districts need public health education quite as much as the inhabitants of the larger towns and the work already done there in establishing standards of right living, household sanitation, and disease prevention is worthy of commendation.

*

Germicidal Effect of Lactic Acid in Milk.—The *Journal of Infectious Diseases*, May, 1915, published an article by P. G. Heinemann setting forth the results of several experiments. His conclusions are in part as follows:

"Some acid-tolerant cells of Bacillus coli may survive the presence of 0.6 per cent. lactic acid in milk.

"B. dysenteriæ, B. typhosus, B. diphtheriæ, B. paratyphosus B, and Spirillum choleræ in in these experiments were destroyed by the presence of 0.45 per cent. lactic acid. It is possible that strains of these bacteria exist which are able to resist a greater amount of lactic acid.

"Acid-tolerant strains of B. coli, D. dysenteriæ, B. typhosus, and B. paratyphosus B may multiply in the presence of quantities of lactic acid which are destructive to the majority of cells. The smaller the initial amount of lactic acid, the more likely is the growth of acid-tolerant strains. Consequently, the slower milk sours, the greater is the danger of pathogenic bacteria surviving.

"The growth of the test bacteria is influenced to a marked degree by the amount of acid present. Up to a fairly definite amount of acid there is an increase in numbers, followed by a decrease, which becomes more pronounced as the amount of acid increases. The amount of acid may increase after the number of bacteria has commenced to decrease owing to the liberation of enzymes.

"Acids other than lactic acid are frequently present in buttermilk. Buttermilk, therefore, should be looked upon with suspicion, especially if heavily polluted, unless prepared from pasteurized milk. Still the chances of buttermilk becoming a carrier of infection are much smaller than of raw sweet milk.

"The presence of saprophytic bacteria in buttermilk may have some influence on pathogenic bacteria. Whether this influence is favorable or otherwise, is difficult to determine by present bacteriological methods."

*

Isolation of the Typhoid Bacillus from the Living Body.—The *Presse Medicale*, March 25, 1915, contains an article by Carnot and Weill-Halle describing a unique but simple device.

"In a small U tube with narrowed inferior portion fine sand is introduced to a depth of two cm. The specimen of blood is mixed with ox bile, filtered and sterilized in the autoclave. The bile blood mixture is poured into one limb of the U tube and sterile bouillon into the other, to the same level. The bile prevents clotting of the blood and is, to a certain extent, a selective medium for the typhoid organism. The sand filter in the U tube prevents admixture of bile and bouillon, but allows the very motile typhoid bacilli to pass from the bile culture to the bouillon, with the result that in the case of a positive test, a typical bouillon culture is seen on the following day. Positive results are constantly obtained in the first few days of a typhoid infection, and usually persist throughout the first week."—*New York Medical Journal.*

*

Sterilization of Water by Chlorine.—An apparatus described by J. J. Harper Nelson in the *British Medical Journal* of May 8, 1915 "consists of two bottles, one of about thirty ounces capacity, the other holding about two ounces. The larger is fitted with a double perforated stopper through which are passed two glass tubes, one short, the other reaching nearly to the bottom. Both are supplied with stop cocks. The long tube is connected with a short tube inserted through a stopper in the small bottle. Twenty ounces of water are placed in the large bottle and two drams of concentrated hydrochloric acid in the smaller along with fifteen grains of powdered potassium chlorate for the liberation of nascent chlorine and chloric dioxide. These gases are passed into the water in small amounts at a time with frequent shaking. This yields a solution of the two gases of such strength that when one ounce of it is added to five gallons of water, a concentration of chlorine gas of one in 500,000 is obtained. Repeated experiments with naturally and artificially contaminated water have proved that an exposure for half an hour to this concentration of chlorine suffices to sterilize it completely of all pathogenic organisms, particularly of the fecal group. The entire process consumes little over half an hour, and can be easily carried out effectively even by an inexperienced person. The amount of chlorine in the finished water does not impair its palatability or its potability. If the water is very turbid, it can first be cleared by sedimentation over night with alum; it is then treated with the chlorine solution. An outfit has been designed which weighs only twelve pounds and which can be easily carried on a man's back. This outfit contains sufficient material to sterilize 19,800 gallons of water without replenishing, or enough to give each of 200 men a gallon of drinking water a day for seven weeks. The process is inexpensive, rapid and effective."—*New York Medical Journal.*

*

Frequency of Tuberculosis Infection in Childhood.—Doctors Veder and Johnston have recently made a study of 1,321 hospital children in St. Louis and find that the percentage of positive tuberculin reaction reaches a maximum of 44 per cent. of the age period of 10 to 14 years, including cases with clinical tuberculosis. If children with clinical tuberculosis are excluded the percentage giving positive reaction at the 10 to 14 age period is only 36. These figures are much lower than the usual "90 per cent." figure for the incidents of infection with the tuber-

cle bacillus at the fourteenth year. This is the figure based upon the experiments of Hamburger for Vienna. It is found, however, that the extent of infection among children varies in different cities and countries and is dependent on such factors as living and social conditions, the amount of tuberculosis in the community, the exposure of the child to open tuberculosis, and in all probability varies in the same community. Thus, although, no definite conclusions can be drawn from any one city, it is felt that the statement that "90 per cent. or more" of individuals are infected by puberty is an extreme exaggeration of the actual conditions which exist.—*American Journal of Diseases of Children.*

*

Pure Cultivation in Vivo of Vaccine Virus Free from Bacteria.—Dr. Hideyo Noguchi sets forth in the June issue of *The Journal of Experimental Medicine* the results of his experiments in vaccine cultivation. We quote from his summary as follows:

"Vaccine virus freed from all associated bacteria by means of suitable disinfecting agents can be propagated in a pure state in the testicles of rabbits and bulls. The virus cultivated in this manner is not only devoid of all bacteria, but appears capable of indefinite transfer from one animal to another. Sixty passages in rabbits of a pure strain have been made within one year.

"Several transfers from testicle to testicle are required to bring about accurate adaptation of the virus to the testicular parenchyma, so that continued propagation in this way can be certainly secured. During the first transfers from testicle to testicle the activity of the virus may be less than the original skin specimen from which the pure strain was derived; but as the transfers proceed the activity rises until, when the adaptation is complete, the activity of the testicular equals that of the skin strain.

"The multiplication of the virus within the testicle is maximum on the fourth or fifth day after inoculation; the quantity of virus remains about stationary until the eighth day, when diminution begins. At the expiration of five weeks no more virus could be detected in the testicle.

"The vaccinal processes in the skin, cornea, and testicle of rabbits are practically identical whether the virus employed for the inoculation has been the original skin strain or the pure testicular strain; and the skin lesions produced in the calf with the two strains are also identical.

"In conformity with the finding mentioned in the last paragraph it has been found that human beings react to the pure testicular strain of vaccine virus in an entirely typical manner. In the case both of original vaccination and revaccination the vaccinal effects cannot be distinguished from those arising from uncomplicated skin virus.

"Pure strains of testicular virus are readily produced, and once secured they may be propagated in a pure state by the method described in rabbits or bulls without difficulty and with economy. The pure strains thus obtained should supply an ideal form of virus for employment in the vaccination of human beings."

*

Artificial Immunity in Cattle.—The State Live Stock Sanitary Board of Pennsylvania has recently issued a bulletin, circular No. 32, giving the results of a large amount of experimentation in producing artificial immunity in cattle against tuberculosis. The following are the conclusions:

"Intravenous injections of tubercle bacilli from human sources, non-virulent for cattle, are capable of conferring an immunity in cattle against tuberculosis sufficient to withstand natural infection by association with tuberculous cows. The length of the immunity conferred has not been determined definitely, but it is believed to gradually diminish after two and one-half years. The vaccinated animal during the period of vaccination and for some weeks afterwards is more liable to contract tuberculosis than a normal animal. The natural resistance of the animal is apparently lowered during the time of vaccination. The interval between the vaccinations should be of sufficient length to allow any reaction following the previous vaccination to entirely subside. The degree of immunity obtained in the animal depends to a certain extent upon the number of vaccinations and the amount of vaccine administered. The vaccine should be prepared so it contains no clumps of bacilli and should be administered fresh. A number of the vaccinated animals may give a typical tuberculin reaction following the vaccinations for a period of twenty months. These animals may or may not show lesions or tuberculosis at autopsy. Vaccine administered to animals already infected with tuberculosis is

capable of retarding or holding in check the progress of the disease. The milk from immunized cows when fed over a long period of time appears to increase the resistance of calves and pigs. Vaccination of calves against tuberculosis is of assistance in the eradication of tuberculosis from a herd if done under the proper conditions. Until further knowledge is obtained in regard to the destruction or outcome of the living tubercle bacilli constituting the vaccine, no practical method for the immunization of milk-producing animals under ordinary conditions can be advocated."

Part two of the report is devoted to a theoretical discussion of the principles involved.

*

Ophthalmia Classes in New York Schools.—The city of New York has been particularly successful in the work done by special classes for the segregation of public school children suffering from infectious eye diseases. This work was begun in October, 1912. A discarded public school building was remodelled and furnished in the most sanitary manner. Two classes, a junior and senior, of mixed grades were established. And here children who would formerly have been excluded from school are transferred without delay. The children still continue their studies although the school hours are shortened and much more attention is given to instructing the child in personal, family and social hygiene than in continuing his grade lessons. The children are required to attend school and it is thus made certain that each child receives the required treatment. The effects upon both the children and their families have been most gratifying.—*The Modern Hospital*, June.

*

Malaria.—The *Tropical Disease Bulletin*, for May 15, 1915, is largely devoted to a review of the recent literature dealing with the above disease. Some of the facts gathered from the various papers follow.

The importance of the comparative ability of the different species of mosquito to transmit malaria is shown by the fact that between 100,000 and 250,000 dollars was saved in the sanitation of the Panama canal zone by the knowledge that anopheles malefactor was unable to transmit the disease.

Medical studies show that intravenous uses of quinine in doses of fifteen grains in a dilution of 250 to 300 cc. saline may be used by a competent physician with good results. The discomfort of the patient is quickly and effectively reduced and the benefit conferred is permanent. Alcohol is strongly contra-indicated.

Important factors in exterminating mosquitoes by drainage are outlined. A stream should have steep banks directly above and below the flow line, the course should be straight and free from obstructions. It is often cheaper to line ditches with concrete than to be repeatedly regrading and cleaning them. The only successful method of exterminating mosquitoes is by the destruction of their breeding place; birds or other insect or larva-feeding animals may reduce the number but will not eradicate the pests. Semi-refined and not crude oil should be used to spread over the surface of the water in this sort of work although drainage should always be preferred to oil treatment where possible. Just sufficient oil should be used to form a complete film.

The breeding place of *anopheles* in impounded waters are classified according to the relative importance as follows: (1) groups of pine needles when not closely compacted. (2) Débris consisting of bark, leaves and twigs. (3) Long grass lying on the water surface. (4) Dead leaves floating on the surface. (5) Logs, branches and stumps.

The loss of rural industries through malaria has been studied by the United States Bureau of Entomology. A plantation in the delta region of the Mississippi was selected for study because of the absence of such conflicting features as enteric fever and pellagra. Seventy-four families with a total of 299 individuals were included in the study. During the crop season of 1914 a total loss of 1,066 days of adult time occurred. A smaller investigation in Arkansas showed that the patients lost on an average 5.50 days for each attack.

*

Open Window Classes—The Psychological Clinic, April 15, contains the result of an experiment conducted by D. C. Bliss at Montclair, New Jersey, to ascertain the value of open window classes for students of the second, third and fifth grades. The student population for the experiment and the check classes were carefully selected, and the degree of nutrition, measured in terms of weight gained or lost, the general

health and mental conditions were carefully watched. In each of these three respects the statistics dealing with the four separate open window classes in three different school buildings for two successive years show that these students derived no particular advantage. In fact children under normal conditions showed greater gains in all three respects. The question is the more important because it is the opposite of the result expected. It is interesting to note, however, that almost without exception the parents of the pupils in the open window classes were convinced that their children were greatly benefited, being less nervous and eating and sleeping better than ever before.

*

Is Europe in Danger of a General Pestilence?—The possibility of widespread epidemics in Europe has recently been discussed by many medical magazines; the *Lancet* states that the danger will be much greater in the coming months than it has yet been. The armies are in poorer physical, material and mental condition, while the civil population will be without the assistance of physicians and public health administrators since these are now engaged in the war. Under the waters along the inundated area of the Yser lie 100,000 corpses. Flies are breeding in an unprecedented rate, and the trenches are alive with insects.

The *British Medical Journal* states that there is no cholera as yet in Flanders or northern France, but it has been present in Galicia and Hungary for some time. According to the *Deutsche Medizinische Wochenschrift* sanitary science is practically unknown to the Russians. Septic infections are frequent even when the wounds are slight. There are many carriers of typhoid fever; and smallpox is also raging. The camp diseases, typhoid, malaria, cholera, and dysentery have been with the Czar's armies since the beginning of the war. The efficiency of the German experts is shown by the way in which infections introduced by the enemy have been checked. Yet it is indeed an open question as to whether the sanitary science of Europe will be able to withstand the tremendous strains to be placed upon it in safeguarding the civil and military peoples in Europe during the coming months.—*Current Opinion*, June.

Industrial Hygiene and Sanitation.

Work of a Safety Commission.—Does "safety work" pay? The affirmative answer of C. H. Blakemore, Chairman of the Norfolk and Western Railway Company is enthusiastic.

Data just compiled show that the monthly number of injuries to employees of the company has decreased from 414 in May, 1913, to 172 in December, 1914—a reduction of 57 per cent. while the payroll during the same time has declined but 17 per cent.

The following from *Safety* for April gives further interesting comparisons:

During 1913 a yard employee was injured for each $2,800 worth of yardmen working; during 1914 one yard employee was injured for each $4,600, an improvement of 64 per cent.

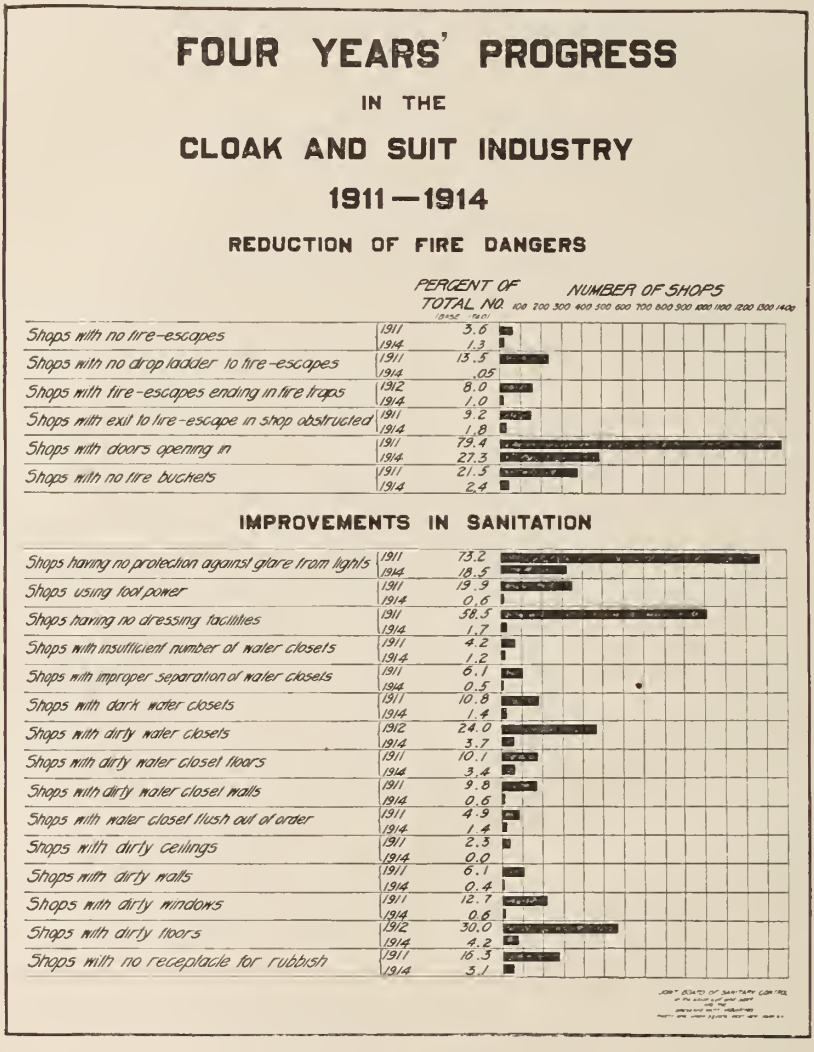
"During 1913 a division employee was injured for each $6,600 worth of division employees working; during 1914 one division employee was injured for each $8,000 of payroll, an improvement of 21 per cent.

"During 1913 a line shop motive power employee was injured for each $2,600 of payroll; during 1914 one was injured for each $3,600, an improvement of thirty-eight per cent.

"When the Safety department was inaugurated by the Norfolk & Western System one employee was being injured for, approximately, each $3,600 worth of payroll. The last month covered by these figures—December, 1914—shows one employee injured for each $7,000 worth of payroll. This is a reduction of which the Safety Commission has cause to be proud."

Sanitation among Garment Workers.—The fourth annual bulletin of the Joint Board of Sanitary Control in Cloak, Suit and Skirt and the Dress and Waist Industries, is an extremely interesting and illuminating pamphlet to one interested in the health of workers or influenced by the environment of shops where they are employed.

The accompanying cut indicates that sanitary conditions in this line have undergone a very considerable improvement during this period.



The following sanitary standards of the Joint Board in addition to the state and municipal legal requirements which are set forth in the bulletin, indicate an extremely intelligent and far-sighted as well as a humanitarian standard in this respect:

(1) No cellar or underground story, the ceiling of which is less than seven feet above the adjoining ground, may be used as a workshop.

(2) Workshops located in rear houses, attics or converted tenement houses must have a special permit from this Board.

(3) All machines and other appliances which are in use, must be placed so as to have sufficient natural or artificial light at all times, the Board to determine in individual cases in regard to all complaints concerning insufficient light.

(4) All lights must be so placed as not to glare in the eyes of the workers; they must be at a distance from the operatives and well shaded.

(5) All shops should be properly aired during noon pauses by opening windows and doors. During the hot season in the summer there should be placed in the shop a sufficient number of electric fans for the purpose of ventilation.

(6) No irons heated directly with coal or gas tubes may be allowed in the shops. Wherever gas irons are used they must be supplied with air pressure; they must be properly adjusted and the pipes made gas tight.

(7) Each shop should have a special caretaker for the cleaning of floors and water-closet apartments.

It is recommended that proper and sufficient lunch accommodations should be provided apart from the work benches and machines, the owner to be responsible for the cleanliness and sanitary condition of the lunch counter.

*

Industrial Accident Statistics.—Bulletin 157 of the United States Bureau of Labor Statistics contains a very complete summary of statistics of industrial accidents. The establishment of boards and commissions for the purpose of administering workmen's compensation laws furnishes a more adequate comprehensive source from which such statistics can be obtained than previously existed.

Statistics from a number of foreign countries as well as from American States are included.

One of the most interesting features of this Bulletin is the inclusion of the classification of industrial accidents as adopted by a number of states and foreign governments.

*

The Employment Certificate as an Instrument for the Enforcement of Child Labor Laws.—The Children's Bureau of the Department of Labor has just issued a study of the administration of the employment certificate system in Connecticut. This is the first of a series of reports to be issued on the enforcement of child labor laws. It is planned to show how child labor laws, instead of merely serving as a salve to the conscience of public and legislature, may be made of practical benefit to working children.

The purpose in these studies is to throw light upon the actual working procedure of various types of child labor laws and to show how various methods of enforcement work out in actual practice.

The employment certificate is the key to the enforcement of all child labor laws, for it prevents children from working until they are actually 14, and also furnishes a ready method of determining exactly what persons at work in an establishment are subject to other laws regulating hours of labor, night work, operation of dangerous machinery and the like.

In Connecticut no child can get an employment certificate and stay out of school unless he has a job, for not merely does he have to produce a promise of a position, but his employer must report when he begins work. The certificate issued is good only for the employer to whom it reads, and is not given to the child, but is sent by mail to the employer. There is no delay in beginning work, however, since either the child or his parent is handed a duplicate labeled "For parent: not good for employer longer than one week." This makes it possible for the child to start work even before the employer has received the certificate sent through the mails. A third copy is filed with the State Board of Education.

If a child quits work, his employer must notify the State Board, and before he can go to work again he must secure a fresh certificate reading to his new employer.

The striking feature of the Connecticut system of issuing employment certificates is that the State Board of Education controls its enforcement and dovetails the working of the compulsory education law with the child labor law. Practically every step is under the direct supervision of the State Board of Education. Agents of the State Board travel from town to town, issuing working papers, inspecting shops, and visiting in their homes children who have left their jobs.

The Children's Bureau finds the Connecticut law weak in the following particulars: First, the law does not require ability to read and write in English, literacy in any language being sufficient;

second, school records showing too low a grade are accepted in lieu of an educational examination; third, physical examination by a physician is required only in those cases where the agent believes physical unfitness exists; fourth, the methods of preventing school children from working illegally out of school hours appear inadequate; fifth, lack of complete coöperation with parochial schools may enable some children to escape the reporting system; sixth, the school census is not yet fully worked out for utilization in the enforcement of the child labor law; and seventh, there is at best great delay in returning unemployed children to school and little or no provision in the schools for the needs of the children temporarily returned.

It would seem from this review that while the education of the child is given a very large emphasis, not enough attention is paid to the question of health. That this is so is only an instance of the general attitude which is displayed toward the question of health conservation. In other words, public health and public education are both advancing but education is still a good many jumps ahead.

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Industrial Accidents in Porto Rico.—The third annual report of the Porto Rico Bureau of labor contains the following statement regarding the causes of industrial accidents:

"The causes of accidents are as various as the acts of man and the implements used by him. Not only so, but there are usually several causes which have contributed, more or less directly, to each single accident. The fault may be that of the injured man or of other persons working with him; it may be in the implement which he is using or in the material upon which he is working; it may be due to an overwhelming force beyond all control; it may be that the fault is actually unknown. But regardless of *how* the accident happened, the injured man or his dependents suffer and those upon whom the support of the injured man, or his dependents, falls are frequently overburdened.

"There is one cause of accidents, recognized by all men who work with machinery but usually not appreciated by the public, and that is inertia. For example, a man worked on a certain machine; he knew all about that machine, he had cleaned every bolt and screw in it; he knew the dangers connected with the machine—and yet he was injured. Perhaps his fingers were caught under the press, perhaps his sleeve was caught in the gearing. He, himself, might say he was careless. The court would certainly say he was negligent. And yet there are always a certain proportion of such accidents. Education of laborers may prevent some of them; the use of guards and other safety devices will certainly reduce their number. The fact is, however, that neither carelessness nor negligence properly explains the majority of these accidents. They are due to inertia, to the fact that the workman has done the same thing over and over until his nerves fail to work quickly enough, his eyesight is a little slow, his muscles are overtired, or he is sick, or some other physical cause, *beyond his immediate control*, prevents his fingers from moving with their usual quickness and his arm from being withdrawn from the gearing in the usual manner. It is due to carelessness and negligence but not such carelessness or negligence as should prevent the injured workman from receiving help. It is one of the almost unavoidable costs of production, a cost in human efficiency or life, and should be borne by the industry which is responsible for it."

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"High Cost of Child Labor."—A recent "Exhibit Handbook," issued by the National Child Labor Committee is entitled "High Cost of Child Labor." This pamphlet contains a considerable array of statistics and photographs calculated to show that in the end the cost of child labor, not only to the child but to society and even to industry itself, is so high that its employment is false economy in the long run.

The cost to industry is pointed out as due to the following results from the use of child labor;

1. Waste of products;
2. Less profits in long run;
3. Lower efficiency of child labor adults.

The relation of child labor to the public health problem is made clear in the following "Vicious Circle" shown in this pamphlet. "You all know how the circle goes: child labor, illiteracy, industrial inefficiency, low wage, long hours, low standards of living, bad housing, poor food, unemployment, intemperance, disease and poverty, *child labor illiteracy*."

At least five or six of the links in this endless chain involve questions of health and its conservation.

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Journal of the Royal Sanitary Institute.

XXXVI, 3. April, 1915.

Rat Plague; and the Powers of a Medical Officer of Health to Cope Therewith. W. M. Willoughby.

XXXVI, 4. May, 1915.

Some Metazoon Parasites Met with in Food Inspection, and Their Relation to Public Health. A. W. N. Pillers.

The Working of the Tuberculosis Regulations of the Board of Agriculture and of the Local Government Board. J. D. Whitehead.

Notes on Eradication of Tuberculosis from Dairy Herds. G. Percy.

The Evolution of Hygiene and Public Health in Australia. W. P. Norris.

Maternity and Child Welfare Schemes. E. W. Hope.

Journal of State Medicine, London.

XXIII, 3. March, 1915.

Government and Civil and Military Sanitation in the Tropics. R. Ross.

Housing Conditions in Their Relation to the Spread of Tuberculosis. A. M. Williamson.

XXIII, 4. April, 1915.

Public Health and Tuberculosis. A. James.

XXIII, 5. May, 1915.

Prevention of Milk Adulteration. T. Bishop.

Lancet, London.

CLXXXVII, 4779. April 3, 1915.

Cerebro-Spinal Meningitis. With Notes on Two Epidemics. E. Norman.

CLXXXVIII, 4875. May 15, 1915.

Chemistry of Rice-Polishing. H. Fraser.

Medical Officer, London.

XIII, 14. April 3, 1915.

Epidemic Cerebro-Spinal Meningitis. R. Douglas.

XIII, 15. April 10, 1915.

Training of Meat Inspectors on Uniform Lines. O. C. Bradley.

XIII, 18. May 1, 1915.

Maternity and Child Welfare Work. A. White.

XIII, 22. May 29, 1915.

The Notification and Control of Venereal Diseases. L. Chargin.

Public Health, London.

XXXVIII, 8. May, 1915.

Lead Poisoning in Relation to Public Water Supplies. J. A. Marsden.

A Note on the Anti-Serum Treatment of the Cerebro-Spinal Meningitis. C. W. Hutt.

Some Notes on a Series of Cases of Diphtheria. W. G. Willoughby.

Revue D'Hygiène, Paris.

XXXVII, 2. February 20, 1915.

The Vaccines. H. Roger.

The Rôle Played by Expired Air in the Transmission of Epidemics. M. A. Trillat.

XXXVII, 4. April 20, 1915.

Experimental Vaccination Against Cholera with Vaccine Sterilized with Ether. H. Vincent.

The Protection of Infants During the First Five Months of War in the Intrenched Camp of Paris. A. Pinard.

Société Médicale des Hôspitaux, Paris.

XXXI, 14-15. May 6, 1915.

Serumtherapy in Typhoid Fever with Rodet's Serum. G. Etienne.

XXXI, 16-17. May 13, 1915.

The Necessity of Bacteriological Researches for the Differential Diagnosis of Typhoid and Paratyphoid Fever. A. Pissavy and P. Abrami.

A Clinical and Bacteriological Study of a Small Epidemic of infectious Icterus. P. Carmot and B. Weill-Hallé.

Zeitschrift für Fleisch und Milchhygiene, Berlin.

XXV, 11. March 1, 1915.

Bitter Milk by B. Subtilis Rievel.

The World War and Germany's Meat Supply During the War. Bongert.

XXV, 13. April 1, 1915.

Some Unusual Pathological Changes in Slaughtering Animals. Warnecke.

The Rubner Method for Differentiating Pasteurized from Unpasteurized Milk. Reiss and Dresselhorst.

XXV, 15. May 1, 1915.

The Storage of the Meat Supply. Bützler.

Comparative Studies on the Value of New Mastitis Diagnoses for Milk Control. Ehrensberger.

Zeitschrift für Hygiene und Infektionskrankheiten.

LXXIX, 3. March, 1915.

The Purification of River Water by Ozone. F. Schütz.

The Operation of a Safe Method for the Treatment of Drinking Water with Hypochlorite. J. D. Ruys.

The Rhein Method for Sterilizing Drinking Water in the Field. F. Gothe.

LXL, 1. April, 1915.

Further Epidemiological Investigation on Diphtheria. R. Klinger, E. Schock.

Investigation on Drinking Water Filters. The Theory of the Slow Sand Filter. K. Kesskalt.

Personal Notes.

Dr. S. L. Jepson of Wheeling, who has served as secretary of the West Virginia Board of Health during the past two years, was on June 1, 1915 appointed State Commissioner of Health for the term of four years under a new law which constitutes a Public Health Council to consist of a state commissioner of health and six additional members.

This Council retains the function of examining board held by the former Board of Health. The first examination of applicants for licensure will be held in Charleston on July 7. The first meeting of the new Council will be held in Charleston on June 11 for organization, and such business as may come before it.

*

Mr. Gustave R. Tuska, M. Am. Soc. C. E., M. Am. Soc. M. E., Consulting Engineer, New York City, has been appointed Lecturer in Municipal Waste Disposal at Columbia University in the city of New York, and will deliver a course of lectures on this subject at the University during the coming year.

*

A dinner was recently given Dr. Theobald Smith of the Harvard Medical School on a send-off to Doctor Smith on the event of his removal to New York where he will take charge of the department of animal pathology of the Rockefeller Institute.

Several speakers lauded his medical research work, especially his discovery of the cause of Texas fever in cattle, and the guest himself was visibly affected by the tributes of his contemporaries. He was prevailed upon to speak of his work, which he did modestly.

Seated at the head table with President A. Lawrence Lowell were Dr. Theobald Smith, President Emeritus Charles W. Eliot, Dr. E. H. Bradford of the Harvard Medical School, Dr. Simon Flexner of the Rockefeller Institute, Dr. W. H. Welch of Johns Hopkins, Dr. Lawrence Flick of Philadelphia, Dr. Frederick C. Shattuck, Col. Thomas Fabyan of Chicago, Dr. Henry P. Walcott, Maj. Henry L. Higginson, Dr. V. G. Moore of Cornell University, George Wigglesworth, Dr. Albert Vanderveer of Albany, Dr. A. Jacobi of New York, Dr. W. S. Thayer of Baltimore and Jerome Greene of the Rockefeller Institute. The speakers were President Lowell, toastmaster; Dr. Frederick C. Shattuck, Dr. William S. Thayer, Dr. Simon Flexner, Dr. Eliot, Dr. W. H. Welch and Dr. Bradford.

*

The following were elected to membership in the American Public Health Association on June 12, 1915:

Arthur Stowell Armagnac, New York. Editor *Heating and Ventilating Magazine.*

Dr. Robert Carlisle Powell, Baltimore, Md. Ex-Secretary Medical Association for the Prevention and Relief of Tuberculosis.

Dr. William Wright Walcott, Natick, Mass. District health officer.

Dr. Lawrason Brown, Saranac Lake, New York. Member of Village Board of Health.

Dr. Aristides Agramonte, Vedado Havana, Cuba. Professor of Bacteriology and Experiment Pathology, University of Havana; chairman, Board of Infectious Diseases; member National Board of Health, Cuba.

Dr. Alfred E. Shipley, Brooklyn, N. Y. Public health officer.

Dr. James Joshua Terrill, Temple, Texas. Pathologist and Temple Sanitarium.

Dr. Walter Belknap James, New York City. Knud Stonmann, Newark, N. J. Clerk, Statistician's Department Prudential Insurance Company of America.

Dr. Arthur Otway Peters, Dayton, Ohio. Chief Medical Inspector, Department of Health, Dayton, Ohio.

Mae Harvey McCrady, Montreal, Quebec, Canada. Chemist and Assistant bacteriologist for the Board of Health, Province of Quebec.

Dr. Walter Vernon Brem, Los Angeles, California. Physician and director of the Southern Branch of California State Hygienic Laboratory.

Dr. Lane Butler Cooke, Quarantine Station, Galveston Texas. Assistant quarantine officer.

Dr. Addison Lysander Linsecum, Galveston, Texas. Assistant state health officer.

Dr. Wm. Bell Collins, State Health Department, Austin, Texas. State health officer.

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PUBLIC HEALTH AUTHORITIES AND THE CAMPAIGN AGAINST CANCER

Curtis E. Lakeman,
Executive Secretary, American Society for the Control of Cancer.

Read before the Section of Health Officials of the American Public Health Association, Jacksonville, Fla., December 4, 1914.

THE American Society for the Control of Cancer is honored by the invitation to be represented on this program, and welcomes the opportunity to ask the coöperation of American public health officials in special statistical inquiries and in educational propaganda in regard to this disease.

But as this is our first appearance in your councils, you will rightly ask for our credentials. It is reasonable that propaganda to combat particular diseases should justify themselves at the bar of the American Public Health Association, as there is naturally a limit to the number of special agencies that can or should be supported by the public and encouraged by the organized body of professional workers in this field. Your Association has a high duty to perform in applying its moral influence to prevent duplication of work and loss of motion in the public health activities of this continent. With any efforts to this end our Society is in full sympathy; as far as we are concerned we desire to subscribe to the principles and submit to the tests of efficiency and real service in either independent or coördinated endeavor.

What, then, is the plan and purpose of our organization?

A few years ago the American Association for Cancer Research, an organization of leading pathologists and laboratory students of this problem, recorded its conviction that although the ultimate cause of cancer still baffles human scrutiny, far too little use is made of the really vast amount of new and old knowledge of malignant disease that we already possess. Urging that it is not necessary, at least in this case, to know all there is to know about the nature and cause of the disease in order to limit its mortality, these men called for a country-wide effort to disseminate the present knowledge of cancer as the first step toward prevention and control. But this was only one of several converging impulses toward an organized campaign against the disease. For years the state of prevailing ignorance and

neglect of cancer in its early stages has been an old story to surgeons. By reason of that neglect an entirely unfair burden has been placed upon the profession. They have been called upon to operate as a last resort. They have been asked to work miracles, and in many cases they have met even that test. Their technique, advancing with the pathology and histology of cancer, has steadily won new triumphs. But the patients and the public have asked too much, and it is no wonder that surgery in cancer has not always been able to show a high average of success. Nevertheless, surgery in cancer is approaching the limit of efficiency, and if the operative method, as yet the first and almost the only recourse, is to save still more lives, aid must come from the patients themselves. Nor is this any the less true with other possible methods of treatment. In any case, the patients must come to treatment sooner, before the disease gets a foothold from which it cannot be dislodged. Realization of these facts has come to surgeons and physicians not as a scientific abstraction but as the result of steadily accumulating individual experiences with all their connotations of human suffering and grief. Every surgeon has records of patients that came months, even years, after the discovery of the first symptoms of cancer, nearly always too late to be saved. It is no wonder that the leading surgeons and gynecologists, here and in other countries, with a deep sense of obligation to stop this unnecessary waste of life, have attempted, individually and collectively, to teach the public that the hope of curing cancer lies in its early recognition and treatment.

Thus the American Gynecological Society, the Clinical Congress of Surgeons and other bodies appointed special committees to consider the subject of cancer education. Eventually the participation of nearly all the special medical societies of national scope resulted, and the American Society for the Control of Cancer was organized in May, 1913, on a broadly representative basis and with the interest and support of influential lay men and women. Almost at once the new organization was officially endorsed by the American Medical Association, the American Surgical Association, the Western and Southern Surgical and Gynecological Societies and by many local medical societies. The Society is supported entirely by voluntary contributions and by the dues of its members, which include both physicians and laymen, on the plan of the National Association for the Study and Prevention of Tuberculosis.

The purpose of our Society is succinctly stated in its constitution: "To disseminate knowledge concerning the symptoms, diagnosis, treatment and prevention of cancer, to investigate the conditions under which cancer is found and to compile statistics in regard thereto."

In working toward these ends we endeavor to act as a special collecting agency and clearing house of information in the field of cancer research, statistics and education. In this respect we stand midway between investigators, research workers, statis-

ticians and all other sources of information on one side, and editors, writers, lecturers, teachers and all the channels of disseminating information on the other hand. In both these fields, in gathering facts as well as in spreading information, we earnestly ask the coöperation of the public health authorities, and to explain our request in detail, is the object of the present paper.

At this point, however, we may be met with the objection that cancer is outside the scope of public hygiene. It will be truly said that cancer is not an infectious disease—at least in any ordinary practical sense. It is not subject to quarantine and disinfection. It has not usually been considered in the class of diseases amenable to public sanitary control. Why, then, should health officials add the cancer problem to their burdens?

We would answer without hesitation that the time is coming, if it is not already here, when public health administration must take fuller account of chronic diseases. The constantly broadening conception of the function of health authorities has already brought the leading departments into this field. I am proud to have been connected, even temporarily, with the New York City Department of Health, a sanitary organization, whose pioneer achievements have given it an historic leadership in municipal health administration. Among its glorious traditions the New York Board counts the early adoption of an extraordinarily broad view of public health functions. More than twenty years ago, by establishing the first public diagnosis laboratory in the world, by initiating the public manufacture and distribution of diphtheria antitoxin, and by creating the scientific service which has since made such distinguished contributions to bacteriological research, the New York Board carried into practice its belief that it is among the proper functions of the public health authorities to furnish any or all facilities and procedures connected with the prevention and cure of infectious diseases. What were then revolutionary extensions of the scope of the public health department are now among its commonest duties everywhere. A similar attitude has characterized the subsequent development of public hygiene in New York, and as in many other progressive states and cities, the activities of the Department are no longer limited to the control of contagious diseases. Any governmental authority that takes a similarly broad view acts in the spirit of that early Christian philosopher, whose light still shines in the phrase: "Nihil humanum a me alienum puto." With like scope of vision let every modern health department declare that nothing in the realm of preventable disease is foreign to its watchful care and interest.

A more definite and practical argument for community action against cancer and chronic diseases is found by analyzing the reduction of the death-rate. It is hardly necessary to remind you that the control of acute infectious diseases in infancy and early life has been the most important factor in the reduction of the death-rate in modern times. But along with this decrease in acute maladies, there has apparently

been, if not an increase, at least no perceptible decline in the prevalence of most chronic diseases. Studies of the evidence to this effect are numerous. One of the most recent is a life table prepared by Doctor Guilfoy, the registrar of New York City. This is based on the years 1909, 1910 and 1911, and the results are compared with a similar table for the years 1879, 1880 and 1881, prepared for the Federal Census Bureau by the late Doctor Billings. Broadly speaking, comparison shows that the expectation of life has increased for all ages below 35 and decreased at all periods above that age. In fact, all the evidence shows that the chronic degenerative diseases of middle and later life demand increasing attention from the forces which are attacking human ills on behalf of society. In so far as any or all of these diseases can be controlled by organized community efforts or by disseminating information as to their nature, prevention and cure, this is a challenge which the public health administration of the future cannot ignore.

Among the diseases of this general group, none is more important than cancer. Of intense human and social interest, clearly the first problem of medical biology, outwardly formidable and discouraging to all efforts for its conquest, cancer may still give more opening than any disease in this group to the well directed attacks of organized intelligence. This is because it offers a concrete problem and a method of attack. While we are waiting for that triumph of research which may lead the way to complete control, we can without the slightest doubt check the cancer death-rate, if only we succeed in disseminating among the people the elementary knowledge which we already possess, and in thoroughly bringing home the lesson of early recognition and prompt surgical treatment.

In relation to the educational campaign, the classical controversy as to whether cancer is or is not increasing is of secondary and academic interest. Whether or not the recorded increase in the death-rate is real or apparent, there can be no doubt of the present importance of this disease as a cause of death in adult years, or of the fact that much of the mortality from cancer is unnecessary and preventable. From the practical point of view, this is the only aspect of the matter that interests us. In 1912 in the registration area, 46,531 deaths from cancer were recorded. It is not likely that many of these deaths were falsely attributed to cancer. The only question is whether better clinical diagnosis and certification improved by autopsy control would not have made the figure still larger. Now 46,531 deaths in the registration area means by competent estimate, 75,000 deaths in that year for the whole United States. This is the figure that gives us pause, and throws the discussion of increase or decrease into the realm of scholarly abstractions. Seventy-five thousand deaths in a single year, against perhaps 150,000 from tuberculosis and 15,000 from typhoid fever! As social workers and health officers charged with the power of government to promote social welfare, must we not ask what

shall be done to reduce that formidable total from 75,000 to 60,000, or 50,000 or whatever may be possible? If it cannot be at once reduced, must we not do our best to hold it at 75,000, while the population increases?

The social importance of cancer is readily apparent when we consider the age distribution. The census report shows that the average age of death in cancer of all forms is 59 years as against 36 years in tuberculosis. Malignant disease attacks men and women in the prime of life when family and business responsibilities render them of greatest use to society. There are comparatively few deaths from cancer at ages under 35, but after that time of life the rate increases by leaps and bounds with advancing years. The importance of cancer as a disease of later adult life is concretely stated in the calculation that 83 per cent. of all mortality from cancer in the registration area between 1906 and 1910 was at the age of 45 and over. In 1911 the specific cancer death-rate in the registration states of 1909 stood at 61 for the age-group 35 to 44, 567 for the age-group 65 to 74, and 795 for ages 75 and over. As is well known the disease is more prevalent among women. Roughly speaking, the mortality at all ages is nearly twice as great among women as among men. At ages 35 to 44 about three times as many women as men die of cancer. At ages over 40 there are more deaths from cancer than from tuberculosis or pneumonia and in this period of life one woman in eight and one man in fourteen succumbs to malignant disease.

These facts are all familiar. We bring you no new knowledge on this occasion, but desire merely to emphasize present knowledge to buttress our appeal to you as health officers to join in the efforts to check this scourge. Surely a disease which causes the death of one person in eleven over forty years of age should claim a share of your attention. From any point of view the cancer problem deserves serious consideration, but it should not be made the occasion of alarming statements, exaggerated fears, or any other manifestation of loose emotion. Rather it calls for a persistent campaign of enlightenment based on nothing but the truth. In this work we believe that state and local boards of health should take the leading part in their communities, and should disseminate among the people the accepted elementary facts about the disease. This instruction should include the following essential points:

(1) Cancer is at first a local and not a constitutional or blood disease.

(2) In the early stages it is curable if promptly recognized and properly treated.

(3) The only reliable treatment yet known is prompt and thorough surgical removal. Medicine is useless. Radium, X-rays, and other methods may have their place in expert hands and special cases, but none of them constitutes the sovereign cure for cancer or supersedes the operative method.

(4) Cancer has not been proven to be hereditary or infectious, and fear because of other cases in the family is groundless.

(5) In the early stages cancer is usually painless and it is often difficult for the patient to realize that the seemingly innocent lump or sore is in reality the same disease that is only too well known in its later and more terrible stages. Yet the disease must be recognized and treated in the early stages to insure a fair chance of cure.

These and similar facts must be repeated through the length and breadth of the land until enlightened self-interest and informed intelligence bring the majority of cancer patients to their physicians or surgeons immediately on the discovery of early symptoms. But this campaign of education must be carried on without arousing needless alarm and without creating a state of panic and carcinophobia. Local agencies can best instruct the people and first among such agencies are the state and municipal boards of health.

In conclusion, then, let me summarize what we would like to have you, as health officers, do:

First, we ask you to take an active and continuous share in the work of careful, rational, public instruction. We hope that you will publish occasional articles in your monthly and weekly bulletins, prepare and distribute well-considered special circulars and leaflets, issue press notices, add this subject to the curriculum of your lecturers, and perhaps make use of certain charts and exhibits. Especially valuable, moreover, is the systematic instruction of nurses and midwives, particularly public health nurses, who come in contact with many people in their homes and are called upon constantly for advice on health questions. Let your nursing staff be fully instructed in the early symptoms of cancer. Remember that in the ordinary hospital training course a nurse is likely to see the disease entirely in the late and hopeless stages.

Already the state boards of Kentucky, Virginia, Louisiana, West Virginia, Michigan, Nebraska, New York, North Carolina, Kansas, and the city boards of New York, Toronto, Rochester and doubtless numerous other states and cities have undertaken some form of educational work in this field. In England, the cancer campaign is entirely in the hands of the public authorities. At the instigation of Mr. Charles P. Childe, a prominent surgeon of the south of England, the city of Portsmouth has commenced an active campaign which has recently been described by the Medical Officer of Health, Dr. A. Mearns Fraser, in a paper before the Royal Institute of Public Health, the British organization which corresponds to the American Public Health Association. Already other English health officers are taking up the work of instructing the people within their spheres of influence. The Central Midwives Board sends a circular of instructions on cancer of the uterus to every registered midwife in England and Wales.

In the second place we seek your assistance on the side of gathering information. We would consider this to be our chief function if we might be assured that the educational campaign would be taken care of by local agencies. There is and will be a continuing need of a central clearing house of information and statistics in regard

to cancer. We are interested not only in the improvement of cancer statistics generally but in the uniform recording of hospital and clinical experience with the disease and in the careful following up of operative results. We are interested, moreover, in special statistical investigations of the distribution of the disease and its greater or less prevalence in given localities. For the study of hospital records we have prepared a series of blank forms on which we are asking the leading cancer and general hospitals to furnish us with transcripts of case histories. As the tabulation and study of this material brings to light new and certain knowledge, we shall transmit it to you as the active centers for its further dissemination among the people.

In general, what is first needed is such an improvement in cancer statistics as will give information in detail regarding the specific organs or parts of the body affected, always of course, with relation to age and sex, and in the southern states to race. In this connection a notable advance has already been made by the Director of the Census in ordering, at our suggestion, the publication of cancer mortality statistics in much fuller detail than hitherto under some thirty titles of organs and parts on a plan similar to that used by the English registration office.

The coöperation of all statistical offices in the several states and cities is particularly requested to insure success of these plans for a more thorough and detailed study and recording of the incidence, treatment and mortality of cancer.

Discussion.

Dr. Charles J. Hastings, *Toronto:* In the establishment of the American Society for the Control of Cancer, there was established probably one of the most important and most valuable life-saving organizations on the continent. It is difficult to understand why those of us who have been entrusted with responsibility of not only preventing diseases but of prolonging and safeguarding human life should have overlooked our duties in regard to the educative phase of this problem.

Dr. C. F. Bolduan, *New York City:* In speaking of the way in which health authorities can aid, I thought the previous speaker overlooked one point, a point in which he has done quite a little, and that is in securing diagnostic facilities for examination of specimens. Some time ago in speaking to Mr. Lakeman about just this phase of the matter, he suggested that the New York City Health Department should, in connection with its diagnostic laboratory, also offer to physicians to diagnose specimens removed at operations. The suggestion was made in a formal letter to the Department of Health and was received very favorably. The Department was about to go ahead on that proposition, realizing the very great value of the suggestion that had been made, and then learned that the New York State Institute for the Study of Malignant Diseases in Buffalo, was prepared to do just that thing, and arrangements have been made now whereby physicians in New York State can send their material for microscopic examination to the New York State Laboratory. It seems to me that this is an example which health authorities generally might copy, because, as you all know, in a great many hospitals, small tumors and other things are removed at operations and unless there is a competent and interested pathologist connected with that hospital,

nothing further is done with that specimen and the physician frequently remains ignorant of what he has actually removed. It seems to me that health authorities might very well add to the diagnostic laboratory work they now do, a division of microscopical cancer diagnosis.

Dr. W. F. Snow, *New York City:* I should like to ask Mr. Lakeman a question. I was very much impressed with the clear-cut things he had in mind that health officers should do to help this new movement. Among those he stated that he desired to have us in the health department from time to time publish articles in our monthly bulletins—publish or distribute special pamphlets. Is Mr. Lakeman prepared to furnish the material or substance of such short articles and such a special pamphlet? It seems to me that one of the very excellent things Mr. Lakeman has in mind is reaching the public through local and state health departments, in other words serving as an agency, it seems to me, for furnishing the things that should be said, asking the health department to serve as the agency for giving prestige or backing to him, and I believe that is one of the important things that is coming about in the relation of public agencies to private agencies where we are overburdened with the administrative detail now put on the health department. If these private agencies that have all this material and serve as a clearing house, can bring this coöperation about, it seems to me it is a very favorable thing, and my question is how much assistance he is prepared to give us if we undertake to do this publicity?

Mr. Curtis G. Lakeman, *New York City:* Doctor Snow has exactly diagnosed the purpose and intention of the American Society for Control of Cancer; that is exactly the service we would regard as our privilege to undertake. We particularly feel that it is our function to act as a clearing house for gathering the latest and best information and statistics in regard to cancer and turning that into the form of articles or bulletins or data that can be sent out and used by the local health officers and any other appropriate agencies for the instruction of the people and we are not only ready but extremely glad to respond to the request of any health officer who desires assistance in that respect. The offices of the American Society for the Control of Cancer are located at 105 East 22d Street, New York City.

MIDWIVES: THEIR INFLUENCE ON EARLY INFANT MORTALITY.

C. C. Terry,
Health Officer, Jacksonville, Fla.

Read before the Health Official Section of the American Public Health Association, Jacksonville, Fla., December, 1914.

IN THE following review of deaths under one month in Jacksonville, for the past six years, I have attempted to suggest a line for further investigation rather than to add definite information to the multitude of causes which unite to render so perilous the first four weeks of life. Our figures, while not conclusive, are at least suggestive of a factor in early infant mortality which, by very reason perhaps of a complete medical understanding, has, for a period, escaped our daily vigilance.

My attention was first directed to a certain age-period, as presenting a field worth careful study, about a year ago, while preparing my annual report. In following the outline suggested by the Committee on Uniform Health Reports of the Massachusetts Association of Boards of Health, we classified our deaths under one year according to a table sub-divided differently from any we had before employed. Thus classified, there was presented a period which furnished seemingly an undue proportion of deaths in the first month of life. This period is determined from about the fifth to the eighteenth day of life, though under certain conditions its margins may extend from the third or fourth day to as late as the twenty-fifth day, depending upon rather definite factors.

It was also observed that the great majority of these deaths were those of colored infants, which fact, by reason of our local customs, naturally suggested ignorant midwifery as having, possibly, an etiologic bearing. Corroborative evidence was found by a review of the causes of death operating at this age period: "lockjaw," "convulsions" and "spasms" occupied prominent places in the list, while "hives," "cold," "too weak to live," "thrush" and other equally absurd terms, though not so suggestive, occurred with disquieting frequency within the same age-period.

An investigation for opthalmia neonatorum conducted through a district nurse threw additional light on the subject when she discovered that the term "hives," as employed by the negro midwives, was a condition characterized by inability to nurse and terminating in convulsions, actually, she believed, tetanus neonatorum. We had noted for several years that this infection occurred with considerably greater frequency in the practice of midwives than in that of physicians. For the year in question, 1913, out of a total of 12 deaths attributed to lockjaw of the newborn, 10 occurred in the practice of these women. During the age-period of tetanus we find, under "convulsions of infants," 5 deaths of the total 7;

under "prematurity," 3 in a total of 4 and under "ill-defined," 17, all of which were attended at birth by midwives.

The classification of deaths, where the sole attendant was an ignorant negro midwife, is of course far from accurate. Where the cause is given as "lockjaw," however, owing to the characteristic symptoms of the disease, one is inclined to lend credence to the statement, even were not their methods of handling obstetrical cases such as to corroborate their diagnoses. A knowledge of these facts leads one to view with grave suspicions of tetanus other deaths attended by them when occurring in this age-period, even though, perforce, classified under other headings.

Convinced by these preliminary findings that some regulation of the operation of these women was highly desirable, an ordinance was presented to and finally passed by the City Council "to regulate and define the practice of midwifery." This ordinance defines midwifery as does the statute of New York State. It provides for the issuance, by the health department, of permits to those who shall pass a satisfactory examination in the elementary principles of midwifery and it requires that free instruction in these principles be furnished by the health department. The penalty clause provides for fine and revocation of license.

I realize the incompleteness of the system, but make no apology for it as it was felt that no plan was destined to even partial success that should not recognize the inborn customs of the classes affected, for a time at least, the bill being framed to preserve the integrity of the midwife, as a matter of present expediency, while minimizing as far as possible her dangers by training her in the most important duties of her calling. It must be understood, in this connection, that for the past five years, 51.6 per cent. of all births in this city have been attended by midwives. To have debarred them from practice would at once have deprived more than half of the child-bearing women in the city of their customary attendant; many could afford no better service nor could I suggest any practical plan for replacing them, on so large a scale, with more skilled attendants.

Of necessity the training given them has been of the simplest nature, confined for the most part to the principles of surgical cleanliness, the prevention of opthhalmia and tetanus and the recognition of conditions requiring skilled intervention. Ophthalmia outfits, similar to those devised by Dr. J. J. Kinyoun and used in the District of Columbia, as well as aseptic umbilical dressings for the prevention of tetanus, have been prepared by the department and furnished free to all midwives and their use enforced, while each one is required to attend cases under the supervision of the department nurses.

To return to a discussion of the tetanus period, I would call your attention to the table on page 699, on which are shown the deaths under one month occurring in Jacksonville during the past five years, classified according to the table referred to above. The first column shows those deaths where the

attendant at birth was a midwife and the second column those attended by physicians. It will be noted at a glance that a marked difference occurs during a certain age-period and during this particular period alone. The deaths occurring during the balance of the first month run a nearly parallel course regardless of birth attendant. This period commences at the fifth day of life, reaches its height at about the ninth day and practically ceases by the 17th or 18th day. No other single cause of death operates with particular frequency at this period. Congenital malformations of the heart and other serious deformities, injuries at birth, atelectasis and many of the premature births succumb, for the most part, prior to the 5th day, and other acute infections do not begin until after the termination of the tetanus period. Here we have a period of about 12 days that furnishes for the 5 years, 1909–1913, 63.63 per cent. of all the deaths occurring in the first month of life where the birth attendant was a midwife and 33.78 per cent. where physicians attended the birth. During the same period of five years, lockjaw is given as a cause of death 19 times by midwives and 5 times by physicians, but in the practice of these women 140 deaths occurred between the 5th and 20th days as against 50 in the practice of physicians.

I believe that but little attention should be paid to the stated cause of death at this time of life whether the attendant has been a physician or a midwife as in both instances the cause is apt to be indefinite if not ridiculous. That tetanus neonatorum is a far more common cause of early infant mortality than our death certificates would indicate, I am convinced, and that it occurs also in the practice of physicians with inexcusable frequency is indicated by our records. It is interesting to note, in this connection, that it is given as a cause of death most often by those members of the profession whose known methods are such as would lead one to expect its occurrence.

I doubt if Jacksonville is afflicted with a more ignorant class of midwives than many other southern cities, and even in other sections of the country it is not improbable that a different subdivision as to age-periods, of the deaths occurring during the first month of life, would indicate the existence of an amount of tetanus hitherto unsuspected. The general mortality table in the annual report of the health department of Boston for 1912 permits the outlining of the tetanus period. This table shows between the 3d and 7th days a sudden and very marked rise in the number of deaths recorded, though none are placed to the credit of "tetanus," nor may the birth attendant be determined. A sudden upward curve at this period, however, should call for close scrutiny. No other report available contains a mortality table so sub-divided as to show the tetanus period.

That dangerous infections of any nature might be expected in the practice of these women, no one, familiar with their type, may doubt. They belong, for the most part, to the most ignorant class of negroes, many of them infirm through age and all governed by folklore and superstitions

quite easily traceable to the East Coast of Africa. A favorite umbilical dressing consists of grated nutmeg and raisins while lard or fat bacon is preferred by others; an approved prophylactic for stomatitis is the wiping out of the infant's mouth with one of its own soiled napkins and the occurrence of tetanus is attributed to the fact that the mother cried out with her labor pains.

Of almost general belief is the danger attendant upon bathing the baby or mother, changing the bedding or even sweeping the room within nine days after birth and, if to such imprudences were added the removal of ashes from the stove or fireplace, it is doubtful if even the most gifted among them could avert the dire consequences that would assuredly ensue. While ridiculous to relate, the tragic bearing of these beliefs and practices on early infant mortality must not be lost sight of. Not only should we take into account their active rôle as agents of death, through their filthy methods, but also their passive agency which operates through the custom, among our more ignorant and poorer classes, of supplanting skilled medical attention with the ministrations, however innocuous, of these women, during the early weeks of infancy.

I do not of course wish to imply that all of the deaths occurring during this "tetanus period" are caused by lockjaw. Other causes, peculiar to early infancy, probably operate to some extent throughout this period. That tetanus neonatorum, however, is a factor of importance would seem to be substantiated by the apparent results we have seen since the worst of our midwives have been removed from practice and sterile umbilical dressings have been used by the remainder. The average number of deaths occurring in this period yearly from 1909 to 1913, in the practice of these women, has been 28 and in the practice of physicians, 10. For the 11 months elapsed during the present year the midwives' cases show only 14 deaths and 7 of these occurred in the first three months of the year, prior to the distribution of our sterile umbilical dressings.

It is of course too early to draw conclusions, but the chain of evidence is so nearly complete that I feel warranted in continuing the system instituted and perfecting its operation as experience may show us new ways. Dr. Juan Guiteras has kindly furnished me with some figures from Havana where, since 1906, sterile dressings have been furnished to midwives. This has resulted in reducing the death-rate from tetanus from 7.11 in 1905 to 2.83 in 1912, per 1,000. Traumatic tetanus is included in these figures but, Doctor Guiteras says, the cases were nearly entirely those of the newborn. He does not state whether deaths between the 5th and 15th day, from causes other than tetanus, have been reduced since the institution of this procedure.

The following table shows the deaths occurring in Jacksonville in the tetanus period by months and birth attendant from 1909 to 1913:

DEATHS IN "TETANUS PERIOD" AND BIRTH ATTENDANTS 1909–1914.

	1909.		1910.		1911.		1912.		1913.		1914.		Totals 1909 to 1913.	
	M.W.	M. D.	M.W.	M.D.	M.W.	M.D.	M.W.	M.D.	M.W.	M.D.	M.W.	M.D.	M.W.	M.D.
Jan.	1	1	4	0	3	0	4	0	6	1	2	0	18	2
Feb.	2	2	2	1	6	0	3	1	3	0	3	0	16	4
Mar.	2	1	2	0	0	1	0	3	2	0	2	2	6	5
Apr.	1	0	1	0	3	0	5	2	3	1	0	0	13	3
May	0	0	0	0	4	1	1	1	2	1	1	1	7	3
June	1	1	2	0	5	0	4	2	0	2	3	0	12	5
July	0	0	2	0	0	0	3	0	5	0	0	0	10	0
Aug.	0	3	0	1	0	0	2	0	1	2	1	5	3	6
Sept.	3	2	0	0	3	3	2	0	5	0	2	1	13	5
Oct.	7	1	2	1	2	0	3	0	1	0			15	2
Nov.	4	3	1	1	6	1	2	0	2	0			15	5
Dec.	1	2	1	4	0	3	4	1	6	0			12	10
Total	22	16	17	8	32	9	33	10	36	7	14	9	140	50
Total all causes	32	28	35	25	43	35	59	31	51	29				

There is seen to be no marked seasonal occurrence, though the cooler months furnish a somewhat greater number of cases, the six months September to February, showing 61.5 per cent. of these deaths.

Greater uniformity in health reports and a more detailed sub-division of the deaths occurring in the first month of life would doubtless point to the not uncommon occurrence of lockjaw of the newborn, wherever ignorant or careless midwifery exists, whether practised by the "grannies" of the far South or by the less well equipped members of the medical profession.

Discussion.

Mr. C. H. Wells, *Montclair, N. J.:* I would like to outline briefly an ordinance that our Board of Health has adopted to control the practice of midwifery, simply to enable us to have a nurse at the house at the time of the delivery.

"Every person acting as a midwife in the town of Montclair shall notify the Board of Health by telephone or telegram, at the expense of the Board, immediately after such person is called to attend the confinement or as soon thereafter as the office of the Board is open, and

such notice shall give the name and exact address and name of the person to be attended by said midwife."

That enables the Board of Health in any case it sees fit to have a nurse there at the house. We know the conditions, we know all the practices of the midwife and are able to secure any medical attendance that is needed and the working out of that ordinance should result in a very material decrease in deaths among children whose mothers are attended by midwives.

Dr. G. W. Goler, *Rochester, N. Y.:* How many births do midwives attend?

Mr. C. H. Wells: Doctor Goler has a large city and we have a small city. We have about 500 or 600 births and possibly 200 midwife births. The importance of the matter may be sufficient, the result obtained may warrant us in hiring sufficient nurses to visit all the cases. I don't know that that will be done; it depends on how we find the conditions. It is a new ordinance and I cannot say how it will work out. It seems to me that in a large city there should be nurses enough to follow up all midwives who are not capable.

Doctor Goler: I am only going to speak of what New York has done in order to foist the whole midwife question not only upon itself but upon the South. The midwife ought to be a disappearing institution. Instead of that we are doing something to keep the midwife alive. The midwife ought to be a dead one; we are trying to keep the midwife alive. When we began eighteen years ago under our present law, we had 35 midwives in a city of about 120,000 people, attending 40 per cent. of the births. We now have 8 midwives that attend a little more than 14 per cent., and every one of our midwives that comes before our Board for examination has to pass an examination just as strict as is passed by a third year medical student. We ought not to keep the midwife alive, we ought to pass her on. She does not belong in this art or in this country. That is all I have to say.

Dr. Wm. C. Woodward, *Washington, D. C.:* I am a little surprised to learn of any place where midwives are allowed to certify to deaths. There may be places other than Florida, but ever since I have had anything to do with the public health work, the death has always been certified to by our coroner in every case—the midwife, is, to a certain degree, a disappearing institution in the District of Columbia. At the present time only about 12 per cent. of the entire number of births are returned by midwives. That has been accomplished, however, by a system of examination begun in 1896. No midwife has been licensed in the District of Columbia to practice without examination, and during that time the number of births reported by midwives has fallen from about 42 per cent. to about 12 per cent. and the number of births occurring in hospitals has increased, the proportionate number indicating that there has been a transference. In order, however, to entirely eliminate the midwife, it will be necessary for the government to substitute some cheap service at the time of birth. A woman will employ a midwife who will render such services as she can at the time of birth and attend to the woman for a certain period after birth, giving many ministrations to the mother and child that no doctor will undertake to furnish. The only way to eliminate the midwife is to furnish some proficient and at least equally cheap service.

A Member: I would merely like to state the way we feel about the midwife situation in New York City. The midwife at present delivers about 40 per cent. of all the births and they are doing really excellent work. We have them under pretty good control. All work under a permit of the Health Department. Their work is checked up constantly. We find that they obey many of the rules perhaps better even than the physicians; for instance, the rule in regard to treating the eyes and matters of that sort. The tendency in New York does not seem to be, I think, toward the abolishment of the midwife. I doubt whether we want to work to that end. What we do want to achieve, though, is the education of the midwife, and perhaps some of you know there has been established in connection with Bellevue Hospital, a training school, and the Department of Health now has established minimum standards of education, which standards are those given by the Bellevue Training School. Inasmuch as physicians, I think, do not like the work and usually, as they progress with their practice, give it up as rapidly as they can, it seems to me that we ought to recognize the fact that the midwife is a very useful institution.

THE RELIABILITY OF CERTAIN CLASSES OF DEATH CERTIFICATES.

Dr. Haven Emerson,
Deputy Commissioner, New York City Health Department.

Read before the Vital Statistics Section of the American Public Health Association, Jacksonville, Fla., December 2, 1914.

IN STUDYING the relation between the clinical diagnosis and the autopsy findings in three thousand consecutive cases at Bellevue Hospital up to 1913, and after comparing the inquest papers with the death certificates presented in 800 consecutive cases in 1914 by the coroner's physicians in New York City, I find such persistent and important discrepancies as to make me doubt the value of some of the mortality statistics of the city. I have no interest nor intent in suggesting that the grade of clinical diagnosis is any less high at Bellevue Hospital than it is at other well organized hospital in this country, but I think it suitable to admit the limitations of diagnostic skill when we are estimating the reliability of statistics of deaths. The best training school for the practising physician is at the morgue, particularly if he has had the opportunity to follow the clinical course of the cases which come to autopsy. I am inclined to believe that the statisticians and registrars of records would get almost as much benefit as the physicians from attending autopsies so that they may be familiar with the errors that inevitably occur in spite of the best intentions of the clinician, and be on their guard against accepting improbable or unsupported records of death. Without further discussing the defects of the present coroner system, neither the method of selecting of the officers nor the manner of fulfillment of official duties is such as to give confidence in the accuracy of their results.

On the basis of this study I would urge that measures be taken by registrars of vital statistics to provide a blank space on the death certificates for the statement of the pathologist's conclusion as to the cause of death based on autopsy or other similar pathological information. Further, I think it is time to admit that unsupported clinical diagnosis of cause of death is not sufficiently reliable information in all cases to justify such far-reaching conclusions as are at present drawn from the resulting figures by health administrators, which conclusions would be fully justified if they were drawn from death-rates which could be claimed as correct.

The coroner's office in New York City presents for record 13 per cent. of all the deaths in the city, and of these records, which it may be properly claimed present the maximum difficulty in reaching a complete and accurate opinion, an average of 12 per cent. only are based upon autopsies, of which a record written at the time of the autopsy is kept only in rare instances. Of the cases not autopsied, the certificate of death is presented on

information and belief based upon viewing the body and examination of witnesses. In the great majority of cases there is no information as to the previous history of the deceased, and there has been no physician in attendance. In spite of this almost total lack of necessary clinical information, diagnoses of chronic valvular disease of the heart, even specifiying the mitral valve as the seat of the lesion, or chronic myocarditis, chronic nephritis, congenital heart disease, arteriosclerosis, and broncho-pneumonia, are commonly reported, obviously records which are valueless in the absence of supporting information, such as can only be supplied by autopsy, in such cases of sudden death.

Of the 800 coroners' cases studied, 40 per cent. show altogether insufficient evidence to justify the cause of death as reported in the certificate. Twelve of the 800 cases are recorded as having died from convulsions, an obviously insufficient and unacceptable cause of death.

Over a period of nine months in 1914 we find 21 deaths attributed by the coroner's office to gas poisoning although ocular or spectroscopic proof of the presence of characteristic hemoglobin changes was not obtained to determine whether the exposure to gas in the room where the body was found preceded or followed death. Similarly there were in the same nine months, 371 deaths attributed to submersion, and yet without autopsy proof that the submersion preceded rather than followed the death of the individual.

Owing apparently to indifference or inadvertence there were found 72 cases among the 800 cases studied where there was essential disagreement between the inquest paper and the death certificate as regard the cause of death.

The simpler disagreements are such as these: Chronic myocarditis appears as the conclusion of the coroner's physician after the inquest, *i. e.*, viewing the body and hearing witnesses; endocarditis is the cause as entered in the death certificate; acute nephritis appears on the inquest paper, but chronic nephritis is the cause recorded on the death certificate. Clerical carelessness might account for these. Incomprehensible discrepancies are frequent, as where a hospital record is incorporated with the inquest paper showing that cancer of the bladder and retention of urine caused death; however, the corresponding certificate attributes death to chronic nephritis and acute uremia. Again, a young woman of twenty-two years is reported by witnesses to have been suffering from a severe headache for some time. Seeking relief she took an unknown amount of a "Bromo-Seltzer Headache Cure" and her death followed two hours later, but to the coroner's physician this appeared a plain case of chronic endocarditis and he so signed the death certificate without autopsy.

In seventeen cases there was a total disregard of the clinical record where the patient had died in a hospital and a sufficient clinical examination and record were available. Examples of this are abundant. Typical is the following: A man past middle life and far advanced in extensive pulmonary tuberculosis, took a dose of heroin and cut his wrists and throat with a razor

and was brought to a hospital and treated for traumatic hemorrhage. He admitted the act. The certificate declares the death to have been one of *homicide*, due to throat and wrists cut and no mention appears that pulmonary tuberculosis in any way complicated the case.

In another instance a man was admitted to a general hospital with a respiration of eight to the minute, pinpoint pupils, unconscious and cyanotic, a well-marked picture of morphine poisoning. He lived but a few hours and an autopsy was performed and a purulent bronchitis and chronic myocarditis appear to have been found and these two causes of death alone appear upon the death certificate, no mention being made of the clinical findings, quite incompatible with the morphological findings and no record appearing to indicate that any consideration was given to the clinical record.

In numerous cases suspicious events noted by the police or other observers were disregarded in filling out the death certificate. A man was found dead in a lodging house with a revolver in his hand, one chamber empty, and a hole through the roof of his mouth, and a profuse hemorrhage resulting from this. The police notes in the report are complete and detailed. The certificate states that death resulted from a rupture of a thoracic aneurism. Needless to say no autopsy was performed, the body was not carefully viewed, the witnesses were not examined and the cause of death as stated by the coroner's physician is based on a guess as to the origin of the profuse hemorrhage. Instead of death from violence self-inflicted, we have a record indicating that one of the common tertiary lesions of syphilis caused the death.

The futility of basing any conclusions or determining action in public health work upon such reports of death is evident. I think it is fair to say that with the possible exception of the autopsied cases coming under the coroner's notice, the 13 per cent of deaths reported through the coroner's office represent no reliable information.

Of the death certificates presented from all other sources in the city than the coroner's office, autopsies were performed and reported in the certificate in 1.4 per cent. of deaths.

In	Manhattan,	2.6	per cent.
"	The Bronx,	.2	" "
"	Brooklyn,	.2	" "
"	Queens,	.2	" "
"	Richmond,	1.6	" "

The study of autopsy records at Bellevue Hospital shows that even where attentive and conscientious clinical observation is supplemented by coördinated and efficient laboratory and diagnostic aids, the complete and correct diagnosis of cause of death is not presented by the physician in as many as 50 per cent. of the cases. It will be recognized that there are certain medical and surgical conditions which in the course of their treatment or observation offer almost as reliable information as to the cause of death as can be presented by the pathologist's autopsy. In many instances, as fractured skull, the X-ray gives physical proof to justify and support a clinical diagnosis. Operations which offer

opportunity of direct inspection of internal lesions, as of brain abscess, kidney tumor, or malignant neoplasms of various parts, give as nearly as possible the same information as is obtained at autopsy, even when the latter is supported with microscopic tissue sections and bacteriological culture of pus to substantiate the macroscopic evidence.

Meningeal inflammation with the etiological factor obtained from the spinal fluid, bacteriemic diseases with culture of infective organisms obtained from the blood, specific serological reactions in some diseases, direct or indirect ocular examination of deeply situated structures, accessible through body openings, all present means permitting of accurate and satisfactory records of the cause of death.

One may add that deaths from most of the infectious diseases are correctly reported. In the infectious diseases as recorded in the Department of Health an error in diagnosis of only 1.6 per cent. occurs, as proved by the study of the result of the disease and the clinical course. These cases are carefully checked and kept under observation until recovery or death, and it may be accepted that the small margin of error does not cause any important falsification of our vital statistics.

The so called non-preventable diseases, the progressive organic diseases of the decades from forty upwards, show a proportionate increase as the infectious and preventable disorders of earlier life are decreasing. It is precisely in these diseases that the chance of inaccuracy is greatest, as their diagnosis is based on clinical data not capable in all instances of positive proof during life, although treatment based on the probable diagnosis may have resulted in noticeable improvement of symptoms.

The entire public health movement is based on the possibility of diminishing death and sickness. Our knowledge of the cause of death is based on reports of physicians and coroners. The expenses to the community are so heavy and the necessity of prevention of disease so obvious that the greatest obtainable accuracy ought to be available and only the results of verified diagnosis of cause of death used for the fundamental argument which supports and justifies the greater part of the functions of departments of health.

Universal autopsy practice is unlikely. Education as to the needs of autopsy for the sake of raising the standard of medical practice and diagnostic skill, and for the sake of the public welfare, will slowly prevail against religious objection and racial sentiment. In the meantime we have at hand a means of gathering reliable data by separating the records of death based upon autopsy or other equally valid verification of the cause of death, from deaths which were neither preceded nor followed by sufficient skilled medical or pathological observation. By such a method we should attain two important objects: We should gather facts concerning the cause of deaths against which little or no criticism could be brought, and we should have parallel records of causes of deaths based in many instances upon surmise or insufficient scientific observations.

THE PUBLIC HEALTH AS AFFECTED BY CHRONIC DISEASES OF THE HEART, KIDNEY AND ARTERIES.

Horace Greeley, M. D.,
Brooklyn, N. Y.

Etiology.

LESIONS of heart, arteries and kidneys are found at all periods of life between extremest youth and oldest age. In infancy such cases of chronic heart disease as appear are often due to such developmental faults of the heart or large arteries as cause almost immediate manifestations. Owing to the mechanical factors involved, or to the fact that under such difficulties as are presented by a partially patent foramen ovale or defective valve, the extraordinary muscular strain required to maintain the circulation either directly injures or leads to a hypertrophy whose requirements soon surpass the nutritional possibilities, and consequent starvation and degeneration of the musculature ensue. Developmental imperfections of like character, though of less extent, are undoubtedly responsible for some of the tendency that is observed among families to suffer from chronic heart disease, most of which, however, is probably due to abnormal lack of resistance to those infections, especially rheumatism, which are so frequently directly responsible for its inception.

In youth, before twenty years of age, especially in females, the frequency of acute articular rheumatism, acting to produce an acute endocarditis frequently resulting in permanent injury to the valves, is a causative factor of great importance as regards subsequent chronic disease. Apart from cases associated with arterio-sclerosis or renal disease, such injury from an acute infectious process is probably responsible for nearly all cases of organic heart disease that develop in adult life. Both etiologically and pathologically, chronic heart disease has been divided into cases with primary valvular lesions, cases with cardiac lesions secondary to arterial disease and cases where the heart involvement has been secondary to, and determined by, renal degeneration, but since all attempts along these lines lead to much overlapping and repetition, strict classification of the etiological factors adduced has been avoided.

Agents which cause continuous overaction of the heart, either by causing muscular degeneration through exhaustion, or by direct toxic action upon the muscles or nerve cells, are causes of degenerative changes in the organ. So also is any obstructive influence to the outflow of blood such as lung tuberculosis or cirrhosis, emphysema, stenosis, etc. But especially important is systemic arterio-sclerosis or a constantly constricted arterial system, resulting from the prolonged irritant action of such substances as

alcohol, nicotine, lead, the results of the perverted metabolism of gout, and particularly from the retained waste of chronic nephritis and the overloading of the blood with the products of digestion, notably protein, and intestinal putrefaction.

Syphilis may affect the heart at all periods of life through the activities of the infection in the endo- and myocardium, coincidently of course, with the pathological process which extend throughout the arterial tree in this disease.

Certain occupations that entail prolonged great muscular strain lead to great increase in the bulk of the heart, and, it is held, without commensurate increase in the mechanism by which its cells are fed. This leads to eventual degeneration and dilation. However, it is more than probable that the main cause of the degenerative phenomena is the extra strain to which all the elements of the then more powerfully acting organ are subjected—a strain which is correspondingly more apt to result in accidents to valves, corda tendinæ or nutrient vessels. A sudden severe strain acting on a poorly nourished anemic heart is credited with the ability to produce sudden dilations.

The heart musculature may degenerate in common with similar structure elsewhere when subjected to the long-continued action of vitiated plasma, though this be from diabetes, gout, anemia, primary or secondary, cancer, or infectious agent. This degeneration may be produced either directly through the poisonous action of substances peculiar to the condition or through defective nutrition.

However, apart from the valvular lesions (which, in keeping with their association with acute infectious processes, are more common in the young, between twenty and thirty years of age), the most important cause of chronic heart disease is arterio-sclerosis, and since the heart is but the most active part of the circulatory system, we would expect it to suffer in every instance of this disease, and such is the case. Not only are the endocardium, chorda tendinæ and valves involved in the degenerative processes of this malady, but the coronary arteries and their ramifications in the myocardium are frequently so sclerosed as to seriously compromise the nutrition of the organ. In some instances this circulation is so interfered with that sclerotic areas develop in the walls of the ventricle and acute dilation or even rupture may result.

The anatomical location of the mouths of the coronary arteries is regarded as exposing them peculiarly to the effects of increased blood pressure, since when a hypertrophied, powerfully acting heart throws the blood into the highly resistant arterial tree, the rebound against the closing aortic valve is directly felt in these arteries, arising as they do just beyond the valve.

In these days of wide exploitation and considerable use of coal tar drugs; we sometimes meet individuals who have so paralyzed their circulation and undermined their health through misuse of these agents, that the con-

clusion seems warranted that in at least a few instances degeneration of the cardia has directly resulted.

As statistical evidence of the relative importance of the various etiological factors of heart disease, I quote the figures given by Dunn* in a series of 304 cases. Rheumatic fever was operative in 87 per cent., other infections in 3 per cent., congenital lesions in 7 per cent. and unknown agents in 3 per cent.

Lambert† quotes cases as follows: "Church recorded 889 cases of rheumatism, with 497 cases of acute or chronic heart disease among them. Thompson reported 706 with endocarditis involvement in 329. Lambert, 500 cases of rheumatism admitted to Bellevue Hospital of which 253 showed endocarditis. Thus in a total of 2,095 cases of rheumatism, 1,076 or 51.3 per cent. showed cardiac involvement."

As to the effect of syphilis: The experience of the Gotha Insurance Company of Germany is valuable. This was presented at the Fourth International Congress of Examining Physicians and covered the cases of 1,778 men insured between 1852 and 1904 who had had previous antisyphilitic treatment. Deaths among these gave a ratio of 168 actual to 100 expected. Expected deaths from various causes as compared to actual were also given, and while it was shown that among these once syphilitics, ages 36–50, the principal cause of death was involvement of the nervous system, between 51 and 70 they were mostly from the disease of the heart, blood vessels and kidneys.

As to the effects of alcoholics: "Statistics show that both in Europe and America over 50 per cent. of deaths from cerebral hemorrhage, heart disease and nephritis, are consumers of alcohol."‡ Insurance company comparisons show that from 10 to 15 per cent. more deaths among non-abstainers than others occur. Further, that a moderate drinker of 40 should be charged at the rate of an abstainer of 50 or 55. The Medico-Actuarial Mortality Investigation (New York, 1914) results for alcohol (in Vol. IV), show that among those guilty of occasional alcoholic excess, the mortality is from $1\frac{1}{3}$ to $1\frac{3}{4}$ times the expected at all age groups. Among steady free users from $1\frac{1}{3}$ to 2 times the expected.

As to digestive influences: Doctor Hodges (at the fourth mid-year meeting of medical section of American Life Convention) reported a series of thirty cases, in many of which digestive disturbances, acting over long periods, preceded the cardiac and renal disease.

Cabot§ with the help of modern diagnostic methods, including the Wassermann reaction, classified 600 recent hospital cases, in which a failing heart was the most notable feature, with the following result—in which the marked preponderance of rheumatic cases is a main feature.

* *American Journal of Diseases of Children*, August, 1913.
† *Journal American Medical Association*, March 7, 1908.
‡ Doctor Crothers, Fourth International Congress of Examining Physicians.
§ *Journal of American Medical Association*, Oct. 24, 1914.

	Male.	Female.	Totals.	
Rheumatic	108	170	278	
Syphilitic	52	22	74	
Arterio-sclerotic	53	40	93	
Nephritic	59	58	117	
Total of principal causes	272	290	562	or 93% of all.
Goitre heart	3	5	8	
Doubtful	19	11	30	
Totals	294	306	600	

Irrespective of theories, we know that there are many conditions giving rise to a vitiated plasma, which are uniformly associated with arterial disease. Syphilis is such a prime factor and its damage is so insidious and extreme, that from the standpoint of some life insurance medical men, once a syphilitic is always a syphilitic. Since it is reported that fully 20 per cent. of the general patrons of hospitals during the past few years, and over 8 per cent. of the peddlers recently examined in New York City by the Department of Health, gave positive Wassermann tests, and for other reasons, fully 10 per cent. of the general population can be conservatively regarded as having at some time or another, suffered from the malady. Further, since few so infected are fortunate enough to experience Ehrlich's therapia sterilans magnat, the circulatory systems of the same percentage of the community can be regarded as having been damaged by syphilis. Alcohol and tobacco consumption in moderation can hardly be regarded as more causative of arterial degeneration than the digestive fermentation products to which fully twice the same number of the populace is subject, but when either of these two stimulants, or even coffee, is employed to drive a circulatory system already badly in need of rest, to more and still more work, the combination of stimulant-irritant with physiological store exhaustion cannot but fail to effect that oft-repeated cell damage which soon results in the fibroid changes of arterial disease.

The nervous tension of the hard-working business man in our cities effects somewhat similar results, since nervous driving force, probably acting through gland secretions, as that of the suprarenals is even more capable than either alcohol or tobacco of whipping a circulatory system to work beyond the physiological limit where entire recuperation is possible. Of course, it is just such a case as this that frequently feels the greatest need of a stimulant to moderate the discomfort and inconvenience of the period of exhaustion sure to follow the over-action considered, and if it be a rule to yield to such temptation and the ship, the circulatory system, be driven still

further at the expense of its timbers, the fate of the famous vessel of Jules Verne's *Phineas Fogg* can but be soon reached. At first thought it is difficult to understand how the activities of a business man at a desk, a brain-worker, can compare in wear-and-tear effect with that of a man at the plough or on the wood pile, but when (apart from questions involving the particular salubrity of outdoor air, and the stimulus to digestion of physical labor) we consider that either of the latter operations demand but simple movements of powerful sets of muscles acting almost as units, and with almost the monotony of pendulum action, we realize that comparatively little nervous stimulation is required. Such labor, when not carried to unusual extreme, is but little more destructive of tissue than the rhythmic pulsations of the heart; and, as the latter's rest between beats suffices to prevent damage from overwork, so the complete though momentary suspension of nervous stimulus to the muscles, arterioles and internal-secretion glands, in the alternating muscle-group work of manual labor, acts to spare the finer arterial structure, while the opposite conditions prevail when brain work is involved. Here, a constantly tense arterial tree is required to maintain the needed current and pressure in the central nervous system, and the vessels suffer accordingly. Furthermore, while muscular fatigue drives to early rest, nervous fatigue is easily lost in the overstimulus of anxious or exciting work which has little effect upon the muscles, or again is overcome by the whip of alcohol, tobacco, coffee or the like. Besides, there is no mechanism by which circulatory fatigue can directly manifest itself.

Exposed to the usual influences and hardships of life, the animal organism eats when it is hungry, rests when it is tired, but under the conditions of civilization, eating is primarily a pleasure and rest is often only taken when there is nothing else to do, or where the abnormal stimulants mentioned can no longer substitute or postpone it.

Overeating supplies the material, and nervous and general exhaustion so weaken the digestive activities, that intestinal bacterial agents are allowed full sway, and their activities produce phenol and skatol bodies which diffuse into the blood stream and contribute to the phenomenon familiarly known as autointoxication, which acting continuously is undoubtedly capable of seriously damaging the circulatory system.

Apart from the toxic products of excessive gastro-intestinal fermentation, the food intake is thought to effect the arterial system in another way, and that is through a flood of normal digestive products, especially of protein food, after a well digested heavy meal, so great that both the processes of assimilation and excretion are swamped, and which in their unusual concentration act as irritants to the arterial wall.

Long continued and severe muscular strain, as sustained by longshoremen, while evidently capable of producing arterio-sclerosis is so seldom the sole

contributing element that as a community factor it is indeed insignificant. *Chronic Renal Disease*, as apart from the arterio-sclerotic kidney frequently associated with disease of the blood vessel, and the amyloid condition consequent upon prolonged suppurative processes, occurs in the main varieties known as the parenchymatous and the interstitial, and while these two conditions frequently co-exist in the same organ, there is a distinct tendency of certain etiological factors to produce the one and of other influences the other.

Chronic disease of the parenchymatous form may follow an acute attack, as that induced by scarlet fever or pregnancy, but this is rare, and the disease is usually of insidious onset and somewhat obscure etiology. The most reasonable supposition in regard to the way in which the damage to the renal epithelium is brought about, seems to be that which ascribes these cases to the irritating effect of toxins of infectious or perverted metabolic activity, acting over long periods.

Of course, the very function of the organ suggests that the disease is probably usually due to irritation by abnormal substances passing through from the plasma in the process of excretion. Therefore, the toxins of infectious disease and the results of the ingestion of large amounts of alcoholics are prime factors, as also seems to be prolonged exposure to cold and damp. However, such agents as more commonly lead directly to the interstitial form of the disease may sometimes produce a primary parenchymatous degeneration, for instance, the abnormal products which circulate in the plasma in cases of diabetes, marked intestinal fermentation, or chronic metallic poisoning as with arsenic mercury or lead. Interstitial nephritis may be blended with manifestations, of arterio-sclerosis, which in greater or less degree usually accompanies all cases of chronic nephritis, and it may be a terminal condition of the chronic parenchymatous form, but frequently the connective tissue proliferation is so markedly primary and independent of either of these conditions that separate recognition must be accorded to this form of the malady. It seems to result mainly from vitiation of the plasma by the agents recounted above, but is very commonly directly produced by syphilis. In certain malarious districts this malady also acts to produce this form of kidney disease. Generally, chronic nephritis is more frequent in males than in females, evidently owing to different degrees of exposure to the exciting influences. Arterio-sclerosis and chronic cardiac and renal disease arising in so many instances contemporaneously, or one as a result of the other, and apparently under like or allied influences are thus bound together inseparately in the consideration of all the wear-and-tear effects of human adult life.

Prevalence.

There are available very few statistics bearing on the incidence in various

classes of the population of the three affections under consideration, and those that exist are fragmentary.

Among the thousands of dependent children passing through the Randall's Island institutions, the attending physician, Doctor Harris, tells me that in the neighborhood of 2 per cent. show cardiac lesions, but that in respect to kidney disease the rate is certainly considerably under 1 per cent.

The Bureau of Child Hygiene of the New York City Department of Health began making physical examinations of the children in the primary public schools in the fall of 1908, and from its records (which of the diseases in question only cover those of the heart) I obtained the following figures:

Year.	No. of children examined (usual ages 8–12).	Cardiac lesions.	
		Found in.	Per cent.
1909	231,081	1,503	0.65
1910	266,426	1,426	0.53
1911	230,243	1,661	0.72
1912	287,469	1,597	0.55
1913	330,179	1,912	0.57
Average	269,079	1,619	0.60

Dependent children in city institutions were examined in 1913 to the number of 19,445 and 392 cardiac lesions were found, giving a morbidity rate of 2 per cent. which is in accordance with the experience on Randall's Island mentioned above.

Beginning with the same year, 1909, children 14 to 16 years of age who wish to go to work in New York City, were compelled to submit to examination by a health department physician in order to determine their physical fitness.

Results as regards cardiac disease found, have been as follows:

Year.	No. of children examined, 14–16 yrs.	Cardiac lesions found in.	Per cent.
1909	4,125	21	0.5
1910	24,673	131	.5
1911	29,820	230	.8
1912	43,254	453	1.5
1913	20,335	310	1.5
Average	24,441	229	0.96

Most of these children are probably also included in the figures derived from the examinations made of those attending school.

Advancing to a consideration of the next period of life, the collegiate or undergraduate, I have obtained most interesting figures from the Department of Hygiene of the College of the City of New York. Here, since 1908, 8,817 youths of both the preparatory schools and collegiate departments have undergone careful, general, physical examination, as a matter of routine. Cardiac impairment was found in 162 instances, giving an incidence percentage of 1.83. Urinary examinations were not part of the routine, nor were any arterial lesions noticed.

The next age-period available for consideration comprises the workers of the community, and as the value of figures in this connection depends entirely upon the care and validity of the examining authorities, I have been particularly fortunate in securing the records of the Life Extension Institute of New York City, and those of the New York City Health Department, obtained from the examination of its employees. As pertaining to our subject they are presented in the following tables:

Results of the Examination of Employees of Commercial Houses, Banks, Etc., in New York City by the Life Extension Institute.

(Figures based on the examination of over 2,000 individuals—average 30 years of age—made within the last few months.)

Lesions found.	*Percentage.*
Organic heart disease	5.38
Arterio-sclerosis	13.10
Urinary symptoms, albumin, sugar, casts	35.63
Cases showing combined disturbance of circulation and kidneys	12.77

Results to Date of All Examinations of Employees of the New York City Health Department, 696 Individuals, Ages 15 to 74, Average 32.75.

"Cardiac derangements of various degrees of severity and importance," found in	92 or 13.2 per cent.
Some albuminuria found in,	209 or 30 per cent.
Systolic pressure of 150, plus, and some albumin present in urine, found in	25 or 5.5 per cent.

Statistics presented to the Fifteenth International Congress on Hygiene and Demography by the Director of Investigation of the New York Factory Investigating Commission, show that among 2,486 workers, findings were as follows:

Trade.	No. examined.	Heart disease found, per cent.	Arterial disease found, per cent.	Bright's disease found, per cent.
Bakers	800	6.8	..	0.3
Tailors	800	4.5	4	0.4
Tobacco work	600	4.2	..	
Furriers	83	6.0	..	
Printers	203	2.9	..	
Average all trades		4.88	4	0.35

In 1912, the Joint Board of Sanitary Control of the clothing industry undertook a physical examination of 800 workers employed in this line in New York City. Very few of these individuals were under twenty (104 actually, 12½ per cent.), while 598 were between 20 and 45 years of age, and 98 over 45. Pertinent findings were:

Persons examined	800
Cases organic heart disease found	36 or 4.5 per cent.
Cases arterial disease found	32 or 4.0 per cent.
Cases chronic nephritis found	3 or .4 per cent.

The Committee on Factories of the Chicago Tuberculosis Institute, recently engineered a campaign to further medical examination of employees, as a result of which statistics, presented by Doctor Sachs to the tenth annual meeting of the National Association for the Study and Prevention of Tuberculosis, show:

Among Applicants for Work.

No. examined	666
Chronic heart disease	7 or 1.05 per cent.
Bright's disease found	9 or 1.35 per cent.

Employees' Benefit Association.

No. examined	500
Chronic heart disease	9 or 1.8 per cent.
Bright's disease	6 or 1.2 per cent.

Regular line, life insurance examination experience, is well shown in a paper by Dwight (*Boston Medical Journal*, Oct. 26, 1911), covering the experience to date of paper, of the New England Casualty Company, and is conveniently exhibited in the following table:

Percentage of Risks Declined Which Were on Account of Circulatory Disease, 1844 to 1910.

Territory.	*Percentage.*
New York City and New Jersey	69
Boston and Massachusetts	68
Philadelphia and East Pennsylvania	52
Chicago and Illinois	47
Group of Western cities	45
Group of Southern cities	43

The total percentage of the number of applicants declined by insurance companies on account of various disabilities varies between 10 and 25 per cent., regular line policies; in the large cities of Boston and New York, the average rate is 20 per cent., so that in the neighborhood of one-fifth of the figure given by Doctor Dwight, represents the percentage of all applicants which were declined on account of the various diseases mentioned. A physician official of the Mutual, New York City, tells me that Doctor Dwight's figures were representative of the experience of his company.

While the statistics from these different sources are not altogether corroborative, one set of the other, their general trend is the same, and as a whole we may say that the prevalence of the diseases in question (to the clinical extent discoverable by such examinations) may be estimated about as shown in the following table:

Class.	Chronic cardiac disease.	Other circulatory.	Bright's.
Children under 15	0.6 to 2 per cent.	?	1 per cent.
Youths 15 to 25	1.83 per cent.	?	?
Workers 25 to 45	1.5 to 5.38 per cent.	4 to 13.1 per cent.	0.3–5.5 per cent.
Business men over 45	8.1	5.7 and over	?

From the above the rapid increase in prevalence of these wear-and-tear diseases, as the individual advances in life, is apparent, and since only their gross effects are apt to be discovered, we readily understand their importance and the need of effort to control them in a community.

Mortality.

Apart from defective registration, vital statistics are apt to be misleading for some very important reasons, which are that they are necessarily gathered over different periods and by different men under rules almost as varied and as changing as the styles of dress. If we look up old mortality statistics for organic heart disease, we, for instance, find it here lumped with all forms of endocarditis, or "dropsy," and most probably complicated by additions of many sudden deaths from miscellaneous causes, to an extent dependent upon the sagacity of the physicians of the time or place. Even circulatory disease, as a total, is of varying comprehensiveness, since even today the census authorities include diseases of the lymphatics and cast out cerebral hemorrhage, a condition most certainly dependent upon arterial degeneration. Chronic kidney affections have sometimes been grouped with acute inflammations of these organs. Apart from this we know the record (such as was reported by Cabot a year or so ago in the *Journal American Medical Association*) of divergence between even the best clinical diagnoses, upon which all public statistics depend, and autopsy findings. Therefore, we must not lean too confidently on such broken reeds as the figures which we may dig out, to bolster up a theory. We not infrequently hear "Heart disease has increased 57 per cent. in the United States Registration Area since 1880." "In Massachusetts the rate has risen 105 per cent. during the same period." "In Chicago the death-rate from diseases of the kidneys has increased 167 per cent. since 1880." "The apoplexy rate has increased in the United States Registration Area 84 per cent., and in Massachusetts 135 per cent. in the last 30 years." All of these statements, quoted from authorities, are based upon actual statistics of more or less reliability, but the truth of the deductions made therefrom can well be questioned for reasons such as I have mentioned. Even the comparatively very reliable mortality statistics of the city of New York, upon examination show the marked effects of changes in classification, and of rulings by the authorities as to acceptable causes of death. For instance, the total deaths

from cerebral hemorrhages, recorded yearly from 1900 to 1907, varied between 2,449, lowest, and 2,833, highest, number, while during the same period all classed as from diseases of the circulatory system, exclusive of those of the heart, varied in the same way, between 471 and 878. In 1908, however, either because of changes in routine or requirements on death certificates, or for some other reason, a marked shifting of the usual returns occurred. Cerebral hemorrhage dropped to 1,942 in 1908, then to 945 the next year, and up to and including 1912 had not exceeded 1,130, a figure more than 50 per cent. below that of the lowest yearly cerebral hemorrhage returns, 1900 to 1907, as quoted. It seems that what the cerebral hemorrhage classification lost, general circulatory (exclusive of heart as above) must have gained, since when the number of deaths in the former dropped in 1908, those in the latter almost doubled, being reported as amounting to 1,597, and amounting in 1909 to 2,431 (an increase within 2 years of over 250 per cent.), with 2,370 as the lowest since. However, when the figures are combined (other circulatory plus cerebral hemorrhage) as I have done in the tables included herewith, it seems that at least one possible cause of false deduction will be avoided.

Referring first to Table I, which covers the United States Registration Area, the most accurate, as yet, statistical period, 1900–1912, it will be seen by a glance at the chart and examination of the figures from which it is drawn that organic heart and other circulatory death-rates have climbed within 13 years 31.4 and 19.9 points respectively. Further, that a slight average increase (Bright's) has accompanied the other. To the consideration of Table I, join that of Table II, covering the same factors for the same years in the greater city of New York. Here, let me first mention, that for purposes of comparison I have recorded the rapidly declining high tuberculosis and the slowly falling low typhoid rates. According to the figures, the heart rate has increased crudely 62 points, nearly twice as fast as in the national area, but both Bright's and other circulatory have fallen, crudely, the first 31 and the second 17 points, why should the statistics of the two authorities as regards the last two classifications point in opposite directions? It is hard to say, unless we believe that measures to control the infectious diseases in the metropolitan district have been markedly more effective than those maintaining over the Registration Area and that as a consequence the incidence of these arterial and renal degenerative conditions, which so frequently follows such infections, has been correspondingly lessened. In Table III are combined the New York City organic heart and Bright's disease rates over a period of 44 years, and in the clipping taken from the last published yearly report of the Department of Health of the same city, the separate rates of the same diseases for the Boroughs of Manhattan and the Bronx are given—general circulatory disease figures for this period cannot be accurately obtained.

TABLE I.

DEATH-RATES PER 100,000 POPULATION FROM CHRONIC DISEASES OF HEART' ARTERIES, AND KIDNEYS, 1900-1912, U. S. REGISTRATION AREA.

(In this and the following Table II, cerebral hemorrhage—apoplexy—has been included in "Other Circulatory.")

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Heart	111.2	113 4	117.3	124 5	133 4	131.3	127.6	137.5	128.3	129.7	141.5	140.9	142.6
Bright's	81.5	81.3	81 6	87 6	92.7	92.9	87.9	91.9	83.8	88.5	88.5	87.5	92.5
Other circulatory	103.5	102.2	104.7	103 6	109 7	112.1	110.8	117.9	113.4	119.8	118.1	119.1	123.4

TABLE II.

DEATH-RATES PER 100,000 POPULATION FROM CHRONIC DISEASES OF HEART, ARTERIES, AND KIDNEYS, 1900-1912, IN NEW YORK CITY.

(For purposes of comparison, tuberculosis (all forms) and typhoid rates are also charted.)

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Tuberculosis	280	264	243	246	250	240	246	238	227	214	210	205	193
Heart	112	130	133	126	128	128	133	168	159	148	143	160	174
Bright's	141	153	148	146	157	147	146	130	112	113	116	101	110
Other circulatory	86	85	83	84	92	91	87	82	79	73	73	77	69
Typhoid	21	20	21	17	17	16	15	17	12	12	12	11	10

TABLE III.

COMBINED DEATH-RATE FROM ORGANIC HEART AND BRIGHT'S DISEASE NEW YORK CITY—PER 100,000 LIVING. 1868-1912.

1868	135.0	1879	186.5	1890	248.1	1901	283.1
1869	138.7	1880	180.5	1891	265 4	1902	281.1
1870	157.5	1881	199.0	1892	253.0	1903	272.0
1871	184 1	1882	212.2	1893	253.1	1904	284.0
1872	190.3	1883	219.1	1894	223.8	1905	275.0
1873	176.8	1884	208.2	1895	230.4	1906	279 0
1874	166.0	1885	214.0	1896	240.9	1907	298.0
1875	181.3	1886	216.0	1897	227.0	1908	271.0
1876	181.3	1887	212.7	1898	243.1	1909	266.0
1877	162.8	1888	198.8	1899	245.3	1910	259.0
1878	174.2	1889	238.2	1900	253.2	1911	261.0
						1912	284.0

TABLE IV.

DEATH-RATES PER 100,000 FORMER CITY OF NEW YORK (MANHATTAN AND THE BRONX) AND FORMER CITY OF BROOKLYN (BOROUGH OF BROOKLYN).

(From Annual Report, 1912, Department of Health, New York City.)

Year.	Heart disease.	Bright's and nephritis.	Year.	Heart disease.	Bright's and Nephritis.	Year.	Heart disease.	Bright's and nephritis.
1868		64.0	1883	231.8	168.0	1898	383.7	392.9
1869		71.4	1884	235.8	167.0	1899	368.2	436.3
1870		78.7	1885	252.7	180.2	1900	379.7	464.1
1871		94.7	1886	262.7	188.5	1901	462.6	484.8
1872		116.5	1887	293.1	178.5	1902	491.7	479.0
1873		108.7	1888	282.2	201.4	1903	485.0	507.4
1874		105.6	1889	300.3	259.0	1904	510.1	530.9
1875		90.9	1890	301.7	291.6	1905	509.8	515.9
1876		95.8	1891	345.6	310.9	1906	560.3	530.7
1877	133.1	125.1	1892	359.7	303.0	1907	676.7	524.6
1878	153.1	125.1	1893	354.8	313.1	1908	663.9	465.5
1879	167.0	134.5	1894	329.7	307.8	1909	732.3	506.3
1880	163.0	135.6	1895	360.2	340.6	1910	775.3	519.8
1881	178.4	160.1	1896	377.4	364.3	1911	736.2	471.1
1882	196.3	172.2	1897	352.2	350.2	1912	814.6	522.1

While Table IV shows a similar increase in the total heart disease rates, as was manifested in those for the chronic form alone in Table I and II, it is noteworthy that the combined Bright's and chronic heart rate, as tabulated in No. III, loses its impetus in 1901, evidently from the effect of the diminishing chronic nephritis rate of that and subsequent years. As the net result of the examination of these tables we may conclude that Bright's disease mortality is about stationery or diminishing over the national registration area and in New York City; and that arterial disease, while perhaps lessened in New York City, owing to particularly effective measures taken against infectious disease, is still slightly on the increase generally, while in regard to chronic affections of the heart, the rate tendency throughout the country is distinctly upward. Abroad, according to the Registrar-General's figures, the mortality rate in England and Wales from all three of the diseases in question, has for some years been either stationary or has slightly diminished—the rates being, 1912 report, organic heart disease, 133, other circulatory (plus cerebral hemorrhage), 100, Bright's 35, all, particularly Bright's, being much below those of the United States. In Australia (well known for its general low morbidity and mortality rates) while the Registrar does not give the Bright's and other circulatory rates, the yearly

report for 1911 shows a mortality from chronic cardiac affections of 109. As well as I can ascertain, the general European rates, covering Germany and France, approximate those of the United States Mortality Statistics, as regards total heart affections and renal disease, and although the stress of business life may be much greater in this country, the general consumption of alcoholics in the foreign area is so much greater as to fully balance the account.

Insurance company "regular line" mortality statistics are well represented in the three following tables, giving the experience of the New England Casualty Company quoted from Dwight (*Boston Medical and Surgical Journal*, Oct. 26, 1911):

Table to Show Relative Importance.

Cause of Death.	*Per cent.*
Chronic heart disease	13.25
Arterio-sclerosis	11.25
Nephritis	9.25

Table to Show Increasing Prevalence.

Deaths from circulatory disease. Percentage of total deaths.	*Period.*
10.5	1844–54
15	55–64
25	65–74
34	75–84
40.5	85–94
43.75	95–1904
45 75	1905–1910

Table to Show General Distribution. 1904–1910.

Deaths from circulatory disease. Percentage on total business written.	*Area.*
27	North Central States
26.83	New England
23.16	Mid-Atlantic States
23.00	Western States
21.25	Southern States

Brown (*Journal American Medical Association* Oct. 24, 1908) quotes insurance statistics to show that out of

TABLE V.

DEATHS BY SEX AND AGE-PERIODS, U. S. REGISTRATION AREA, 1912.

Age.	Organic heart.		Other circulatory.		Bright's.		Totals.		All.
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	
Under 20	1,886	2,011	1,228	1,097	785	788	3,899	3,896	7,795
20–39	3,948	3,922	2,344	2,069	2,938	2,971	9,230	8,962	18,192
40–59	11,495	8,980	9,725	7,556	9,852	7,221	31,072	23,757	54,829
60–79	23,044	19,707	20,448	17,190	14,847	10,773	58,339	47,670	106,009
Over 80	5,254	5,831	6,250	6,610	3,192	2,447	14,696	14,888	29,584
Not given	68	33	37	26	29	22	134	81	215
Totals	45,695	40,484	16,461	12,367	31,643	24,222	117,370	99,254	216,624

TABLE VI.

SAME, NEW YORK CITY, 1912.

Age.	Organic heart.		Other circulatory.		Bright's.		Totals.		All.
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	
Under 20 . .	238	278	89	99	48	30	375	407	782
20–39	611	617	206	153	356	299	1,173	1,069	2,242
40–59	1,615	1,310	648	508	1,098	890	3,361	2,708	6,069
60–79	1,768	1,814	1,020	948	1,053	1,062	3,841	3,824	7,665
Over 80	269	370	187	283	155	183	611	836	1,447
Totals . . .	4,501	4,389	2,150	1,991	2,710	2,464	9,361	8,844	18,205

(As before, I have included cerebral hemorrhage in "Other Circulatory.")

9,592 selected risks, 1,255 (over 13 per cent.) were lost from cardiac disease.

Table V and Table VI are offered to show the sex and age distribution of the mortality from diseases under consideration, in the registration area and in New York City. In the registration area it is seen how the sex incidence is approximately the same until the age period, 20 to 39, is reached, when divergence begins and maintains during the periods of active life. The same is seen to be the case in New York City, only that marked difference only begins at the next higher age period, 40 to 59.

Of 640 general autopsies, made between 1900 and 1905 on all classes of cases, 61, or nearly 10 per cent. showed organic heart lesion (Cheney, *Journal American Medical Association*, Aug. 26, 1905).

Prevention.

Having recognized the etiological factors of these diseases, the first consideration in the way of prevention is to do what we can to remove the predisposing cause, both from the community at large as well as from the particularly threatened individual. General hygiene, of course, extending even to infancy, and perhaps to eugenics, must be our main general reliance, and since no one later than the time of Don Quixote has been as fortunate as Sancho Panza in having a special group of scientists in attendance to arrange every particular of his daily routine, public health education in the general principles of hygiene and prophylaxis is essential that everyone be qualified to avoid at least the main pitfalls which continually threaten his welfare. The restriction and elimination, if possible, of infectious disease, such as scarlet fever and syphilis, rheumatism, both acute and chronic, must ever be a main point, since these maladies are so powerful in the premises, etiologically.

All measures necessary to prevent trade poisoning, as from lead, mercury

and arsenic, must be taken, and the individual and community instructed as to the actual rôle of alcoholics and tobacco in the production of such conditions.

Above all, a correct standard of diet, outdoor exercise, and limitation of nervous strain must be inculcated, with a full understanding of the principles involved, and sight should never be lost of the all powerful and disastrous effects of all agencies which act to produce prolonged increase in arterial tension.

The particular danger of employing the powerful stimulants available (alcoholics, tobacco, coffee, etc.) to further drive a circulatory system physiologically demanding immediate rest, should be made plain, as well as the injurious effects of the sedative coal tar and other drugs, when used habitually.

The public must be taught how overalimentation works to poison the system, and be induced to reduce the surfeit of food products, especially meat so frequently ingested. Although "autointoxication" is widely recognized, yet very few individuals ever do anything to avoid or reduce it beyond an occasional gulp of sour milk or a dose of salts, so public instruction as to the physiological requirements of the gastro-intestinal tract must be given.

Individual prophylaxis, apart from the above, consists in correcting as far as possible, any abnormal departures in daily routine or habits, from the hygienic, paying especial attention to any particular point in which the person under consideration seems to be weak, or his health to be menaced. For this purpose periodical medical examination is essential, since very few of the beginnings of these wear-and-tear diseases are noticeable to the patient—sometimes not to the medical man. The value of such examinations to the individual concerned, is well shown in the subjoined table presented in 1913 to the section on social and economic science of the American

ANALYSIS OF RISKS FOUND IMPAIRED. FREE ANNUAL HEALTH BUREAU EXAMINATIONS.

Average age, 49 years 9 months.
Amount of insurance $1,590,635.

Diseases.	Ages 20–30.	Ages 30–40.	Ages 40–50.	Ages 50–60.	Ages 60–70.	Ages 70 over.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Affections of heart, blood vessels and kidneys, diabetes	4.98	13.85	21.65	31.60	23.37	4.54
Per cent. at each age-period unaware of such impairment	65.21	57.81	63.00	60.27	56.48	57.14

Association for the Advancement of Science, at Cleveland, by Doctor Fisk, of the Postal Life Insurance Company. From this it will be seen that an average of 16.66 per cent. of these individuals examined that were found to suffer from the diseases catalogued, were unaware of the condition, and since a certain per cent. must have presented themselves as a result of symptoms, the incidence of these conditions among the same classes at large must be greater.

As a very few cases of circulatory disease are probably produced by overtraining and excessive physical exertion, due warning of such dangers should be given, and every individual necessarily so exposed should be physically examined to determine his freedom from predisposing tendencies, so far as may be discoverable. This plan is now followed in the public schools of New York City where every boy before being permitted to engage in athletic contests must be examined and passed by a School Medical Inspector.

To recapitulate—The prevention of chronic cardiac, arterial and renal disease lies in intelligent regulation of work, diet, rest, exercise, and the avoidance of unnecessary debilitating influences, such as dissipation (alcoholic, sexual, etc.), excessive nervous excitement, extreme overwork or exposure to cold, and the prevention of infectious diseases. In those cases where such diseases are contracted, early and careful treatment is necessary till recovery is complete, and dangerous complications escaped. Education of the public to this effect, together with methodical and periodical physical examinations of everyone to discover early symptoms or tendencies, in order that appropriate means may be taken, that the ounce of effective prevention may save the often wasted—because useless—pound directed to fruitless attempt at cure, would undoubtedly make far more headway against the wear-and-tear diseases which we are considering than the activities of the last thirty years have against tuberculosis.

Detailed Plan for Public Education.

First, in the nature of a survey, any specific factors peculiar to the city, affecting the health of its population, should be learned, social, industrial or what not.

All agencies in the field that are engaged in similar work should be studied to determine what they had accomplished, and the extent to which it would be practicable to coöperate with them. As to specific education:

Beginning with the young and most receptive elements, efforts should be directed to induce the school authorities to so modify the present course of physiology and hygiene as to impart more practical knowledge of the individual's welfare and the manner in which health can be maintained and disease avoided, particularizing the manner in which infectious disease is spread and all those evil effects so powerful cumulatively of bad habits.

Courses of lectures should be organized with a staff of specially qualified health workers, such as may be obtained within the department of

health or from volunteer outsiders who have had fitting experience and possess the necessary ability, so as to give at least one talk weekly during school hours in the assembly room of each and every public school in the city. This lecture system should form part of a regular school course, and an examination should be held by the educational authorities at the end of the term, covering the subjects gone over. Lectures should be illustrated by lantern slides, and at least once a week an appropriate moving picture show should be given in the school possibly Friday or Saturday evening.

Leaflets of instruction should be printed, covering daily habits, the way to keep well, the manner in which infectious disease is spread, etc., in the form of terse "Don'ts" or "Dos" for instance, and regularly distributed to all. For the higher grades and high schools more comprehensive circulars should be issued.

The same staff of lecturers could be employed to address meetings of parents. One such lecture should be held at least every week in each school throughout the school year. Similar lectures should be given to labor and employer organizations, with elaboration to cover the special industrial factors involved. It should be made generally known, through the press and otherwise, that the services of the lecture bureau are at the public's command to supply capable speakers on public health topics on all suitable occasions everywhere.

The course of lectures, should comprise (1) the reasons and objects of the lectures, (2) general information in regard to physiologic and pathologic processes, (3) special talks on general hygiene, injurious habits, etc. How one grows, avoids sickness, takes sick, gets well or dies, should be particularized and the way in which the wear-and-tear diseases develop, their causes and means to avoid them, all should be made plain. Lectures to adults should, in addition, illustrate particularly the etiological factors operative in adult life which predispose to and cause the diseases under consideration. The dangers of quack medicines should be emphasized, as well as the risk of self medication.

For distribution gratis, perhaps as cost price, an almanac or a substitute for the Self-Doctor Book so common in some households should be compiled. It should contain similar information to that imparted at the lectures, and graphic charts of the havoc played by chronic heart arterial and renal disease, and have illustrations, after the manner of posters. It should be attractively printed and suitable for preservation.

A weekly bulletin should be issued in absolutely popular form, and should, together with other health topics, cover specifically the wear-and-tear diseases, giving each subject local and timely color. This bulletin should both be distributed in the school (that beside children, stay-at-home parents may be reached— at lectures, and advanced copies should be sent to the local press. The effects of alcohol and the venereal diseases in maiming and shortening the individual's life should be thoroughly covered in this publication.

Effort should be made to induce the newspapers and popular magazines to feature articles dealing with the diseases in question, particularly from the standpoint of the Chinese doctor, "I teach how to remain well," and coöperation in furnishing information, suggestions and even copy matter should be offered to the editors. Timely, special press bulletins should be regularly sent to all papers, to at least tempt reproduction in their columns.

Special popular-form pamphlets on heart disease, arterial diseases and chronic nephritis, and one on the general advantages of periodical physical examinations for the well, should be prepared and distributed broadcast, with the other literature prepared. The entire field of the etiology prevalence and prevention of these diseases must be covered in concise, interesting and convincing terms, and it must be made plain to each reader, entirely well though he may be at the time, how vitally his future welfare may be influenced by heeding the warnings given.

Attractive billboard posters in popular form, of local and seasonable interest when possible, and street car advertising cards, "with a punch," should be printed covering the main principles of the prophylaxis of these diseases and displayed in appropriate places. New designs should be issued to replace the old each month.

A suitable exhibit could be rigged up on a motor truck or ambulance, arranged so that the people in the street or a surrounding crowd, could inspect it, and the truck should make visits to squares, markets, factory entrances (at noon hour), etc. Pamphlets and leaflets pertaining to the work should be carried and distributed.

An especially efficacious way in which public health literature might and should be circulated, is through an agreement with the Sunday papers. Arrangements to permit such leaflets to be inserted each week in all copies of their publication sold might be made.

In all educational efforts the assistance and coöperation of organizations working to the same and similar ends should be sought, and Sunday schools, churches, clubs, etc., should be invited to aid. Such organizations, as well as the insurance companies, would be effective agents to further the distribution of literature, especially to furnish names to which to send the weekly bulletin.

Appropriate moving picture shows should be staged and the films regularly lent to the various amusement resorts of the city, and used in various places of public assembly. The advantages and need of periodical, yearly, physical examinations for the well should be well advertised in all lectures, prints and press bulletins, and what has been discovered and accomplished already by such methods must be shown. With this end in view an association of existing dispensaries, after investigation and approval of their facilities, similar to the allied tuberculosis clinics, should be negotiated, and their services offered to that portion of the public whose finances did not permit them to pay for the yearly examination recommended. Or, of

course, the health department could directly undertake this work. The interest of large corporations should be solicited in regard to the prophylaxis of these maladies and they should be supplied with the special printed matter for distribution, and urged to encourage or to institute regular physical examinations of their entire personnel.

Small special exhibits beginning with the various features of the causation, prevalence and workings of the maladies in question, should be prepared and sent to schools, private organizations, museums, libraries, municipal ferryboats (for exhibition) and other places where large numbers of people are apt to view them. A large wear-and-tear disease exhibit should be held yearly or even be made permanent after the fashion of the American Museum of Safety.

It would be well to hold, with the coöperation of interested agents, perhaps once yearly, a wear-and-tear disease parade in order to further advertise and interest the public in the measures in hand. This should particularly show the need and the objects of the work, besides the results already accomplished.

THE RESULTS OF STUDIES UPON THE DUST AND BACTERIA CONTENT OF THE AIR OF CITIES.

MELVILLE C. WHIPPLE,
Instructor in Sanitary Chemistry, Harvard University, Cambridge, Mass.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December 3, 1914.

DURING the past two years it has been the privilege of the author to carry on several lines of investigation having to do with the nature of the substances that cause the air of cities to be unclean, their quantity under different conditions, and the natural and artificial means available for their removal. An important part of the work was a quantitative study of the dust and bacteria, impurities of the atmosphere which represent the accumulation of dirt and filth incident to urban life. The study was facilitated by recent improvements in methods and apparatus, and was undertaken partly with the idea of determining the limitations of the apparatus which was employed.

In view of the fact that there is only a small amount of published information which gives reasonably accurate figures for the numbers of dust particles and bacteria in the air, this paper is presented as a compilation of the results obtained over a fairly wide range of conditions. Although the investigations were not broad enough in their scope to be complete in every detail, it is felt that they have furnished a definite idea of the actual amount of certain impurities in the air. Opportunity has also been given to observe where some of the present methods of sampling and examination may be improved.

Some very thorough and conclusive work has been presented in recent years to show that the danger of infection by pathogenic bacteria carried through the air for any considerable distance is very slight in the majority of places occupied by human beings. The work of Chapin on droplet infection, and of Winslow in the schools of New York City are notable in this field, and have been generally accepted as representing the true conditions. In this paper only the total numbers of bacteria are dealt with. No studies of species have been made. Inasmuch as the chances for the presence of harmful forms may be said to increase when the total number increases, it is felt that a knowledge of the latter provides some idea of the comparative safety of different atmospheres. At least it indicates the presence or absence of a clean environment which under the teachings of modern hygiene is of itself a desideratum.

Dust in the air we breathe and its physiological influences are not well understood. We know that respiratory diseases are aggravated by very dusty atmospheres and we try to place patients suffering from them in localities where the air is clean. We know the way in which the air passages and lung cells of subway workers and others in dusty trades become coated with fine particles. But we do not

know to what extent the body ignores this state of affairs, or how great may be the quantity of dust inhaled under varying body resistances without ill effects. Nor do we know whether coarse or fine particles are most injurious, whether the greater danger is in the upper air passages or in the delicate lung cells. There are those who believe that dust is ordinarily of little consequence and behaves as an inert substance when once deposited. It would seem, however, that the larger gritty particles, when lodged on delicate mucuous surfaces, must irritate and even rupture them, preparing the way for chance infection to enter. We know how even a small quantity of dust causes sneezing and irritation in the case of people whose nasal passages are extremely sensitive. Furthermore, dusty atmospheres are dirty atmospheres and most dirt increases the danger from bacteria. We have learned, it is true, that not every dust particle is the carrier of bacteria, but some of them are, and with increasing numbers of dust particles the danger becomes greater. Dust prevention, therefore, merits consideration in the establishment of a clean environment.

For securing samples of air for dust and bacterial analysis the device manufactured by Wallace and Tiernan, 136 Liberty Street, New York City, has been used. It consists of a wooden box 9″ x 12″ x 8″ within which is either a direct or alternating current motor that operates on any 110-volt circuit. A small pump is operated by the motor and this draws in air from the outside of the box through a glass adapter tube that fits into a metal receiving cup. A tight joint is made by means of a rubber gasket. The adapter tube contains a half-inch layer of sand for the retention of bacteria and this is later washed out from the tube with sterile water. For the collection of dust particles a half-inch layer of resorcinol crystals is employed. The crystals are later dissolved in perfectly clean water and counted under the microscope with the use of a 16 mm. objective. Particles from one micron upward can be enumerated in this way. The employment of this method calls for extreme care and scrupulous cleanliness in the preparation of apparatus and the subsequent procedure. Consistent results cannot be obtained unless such precautions are taken.

Much has been written concerning the proper regulation of temperature, humidity and air movement in occupied rooms. We have come to think that the derangement of these factors is responsible in a large degree for our feelings of dullness, stuffiness and general discomfort after a more or less protracted stay indoors. These symptoms are not only apparent after confinement to poorly ventilated rooms but occur to a degree in rooms where ventilation is thought to be fairly good.

Relief is nearly always gained upon going into the outside air. Here the physical conditions are so different that it is possible they all operate beneficially, but it has occurred to the writers that the influence of dust in this connection is one that may have been given too little weight in the consideration of ordinary atmospheres. We are all familiar with the dryness

and parched feeling imparted to the respiratory passages by breathing very dusty air. In a milder degree, this effect is also produced in occupied rooms. Deficient humidity is generally ascribed as the cause, but may it not be that small floating particles of dust, originating from clothing, dirt and abrasion of various articles, also produce effects similar to those of unduly dry air? These particles are kept in motion by various disturbances within occupied places, are usually in a desiccated condition, and have the property of abstracting water from moist surfaces upon which they may lodge. Operating in this way the inhalation of dusty air for several hours may produce to a degree the same unpleasant dryness of the throat and nasal passages that results from breathing very dry air and in addition causing a slight irritation. If so, a more widespread use of some process of air cleansing, such as air washing, is to be highly commended.

How well founded this conception may be is clearly a question for discussion in the absence of any knowledge bearing directly upon the subject. It is possible to show, however, that outside air is nearly always freer from dust than inside air. Examination of dust by the method already outlined, using the microscope, does not reveal the presence of particles smaller than about 1 micron, .001 mm. This is unfortunate, as it may be that different atmospheres vary greatly in their content of particles smaller than this, particles that might almost be said to be "colloidal" in size. Likewise those atmospheres that are most sought for by mankind, in the belief that there are benefits derived from life in them, are cleaner than those that envelope populated communities. Determinations of dust made by the writers in the summer season showed 18,000 particles per cubic foot in the air over Long Island Sound, 27,000 at the fifty-seventh story of the Woolworth Building in New York City at a time when the street air showed 221,000, and 25,000 particles after a heavy summer shower in Cambridge, Mass., where the normal dry weather content was 200,000 or over. Attention is called to the close agreement between these three determinations, representing as they do the dust in air under conditions of obvious cleanliness.

In Table I are given the results of several determinations of dust and bacteria made in a small fresh air school in Cambridge, Mass. There were two rooms, one for kindergarten instruction, the other for first grade work. The dimensions of the first were 21′ x 40′ and of the latter 10′ x 31′. Ceilings were 13′ high. There was no mechanical system of ventilation and air was taken into the room through several large windows and transoms, principally the latter, along one side of each room. A temperature between 50° and 60° F. was maintained throughout the winter. In each room there were about twenty small children and the teacher, the unit volume of air space accordingly being about 500 cubic feet per person in the kindergarten and 200 cubic feet in the first grade.

In all cases the dust particles and the bacteria were more numerous in

TABLE I.

SUMMARY OF ANALYSES OF AIR MADE AT LAWRENCE HALL SCHOOL.

Date 1914.	Dust particles per cu. ft.			Bacteria per cu. ft.					
				Gelatine at 20°C.			Agar at 38°C.		
	Outside air.	Kinder-garten.	First grade.	Outside air.	Kinder-garten.	First grade.	Outside air.	Kinder-garten.	First grade.
Jan. 8....	—	—	140,000	—	—	16	—	—	7
Jan. 16....	68,000	185,000	228,000	3	43	27	0	7	13
Jan. 28....	98,700	107,000	147,000	0	27	50	0	8	15
Feb. 26....	264,000	311,000	363,000	10	10	20	0	13	33

Carbon dioxide determinations made on Jan. 28 gave the following results:

Outside air=3.5 parts per 10,000.
Kindergarten=4.25 parts per 10,000.
First grade=5.0 parts per 10,000.

Temperature and Humidity Readings.

Date 1913–14.	Outside air.			Kindergarten.			First grade.		
	Tem-pera-ture F°.	Rela-tive humid-ity.	Abs. humid. grains cu. ft.	Tem-pera-ture F°.	Rela-tive humid-ity.	Abs. humid. grains cu. ft.	Tem-pera-ture F°.	Rela-tive humid-ity.	Abs. humid. grains cu. ft.
Dec. 12....	33.0	60%	1.316	57.5	39%	2.059	56.0	40%	2.006
Dec. 18....	42.5	75	2.340	63.0	45	2.857	58.0	52	2.792
Jan. 8....	36.0	60	1.474	50.0	39	1.590	49.0	40	1.574
Jan. 16....	26.0	73	1.185	60.5	30	1.753	56.0	35	1.756
Jan. 28....	45.5	79	2.746	59.5	50	2.825	57.5	53	2.798
Feb. 13....	12.0	47	.402	60.0	15	.861	—	—	—
Feb. 26....	35.5	28	.662	62.0	16	.982	58.5	21	1.148

the air of the rooms than in that of the outside air, varying, no doubt, with the amount of disturbance in each room. Likewise, with one exception, the first grade room showed higher counts than the kindergarten room. The smaller volume of air per occupant in this room accounts for this fact. The actual number of children was about the same.

These results are given merely as an illustration of the greater numbers of bacteria and dust particles that are present in the indoor air of one class

of occupied rooms. The numbers are not excessive for schoolrooms, and are in fact considerably lower than the average results obtained by Winslow in the New York City Schools.* This might be expected, as one of the advantages of a fresh air school, the object of which is to provide a rapid change of air between the inside and outside atmospheres.

An interesting sidelight upon this particular fresh air school is the fact that the teachers went through the entire winter without colds, although they had been subject to them in previous years while teaching in the ordinary schoolrooms where mechanical systems of ventilation and higher temperatures were in use. The cool temperature of the rooms, as shown in the table, may have been quite as much of a factor as was the ventilation in maintaining the good health tone. It is of course impossible to separate the effects of the two from any work done by us.

How best to improve atmospheric conditions in the basements and subsurface floors of buildings has long been a problem with department store proprietors. It has been hard to approach the improved standards applied to the upper floors owing to the fact that mechanical means must be employed to change the air, and these must be on a scale larger than ordinarily used because of the great volumes of air to be handled, the absence of air movement below the street surface, the heat radiated from artificial lighting, and the larger crowds that frequent the basement departments. Table II gives the results of some studies in a large Boston store where considerable attention has been given to the ventilation of the basement floor and the mezzanine floor just above it. The latter is described in the table as the "basement balcony." Washed air taken from the roof is supplied to these floors. It does not furnish the entire supply, however, as the exhaust system handles a volume several times larger, the difference being made up by leakage inward from stairways, wells and other openings.

The number of dust particles at various places in the basement was considerably higher than in the incoming washed air or the outside air. Microscopical examination showed that many of the particles were of fibrous structure. The handling of clothes and dry goods and the contact of large numbers of people in passing about the store would naturally give rise to a considerable amount of dust of this character.

There was a striking difference in the numbers of bacteria in the washed air and that in the store. A considerable increase was shown both in the forms growing at 20° C. and those growing at 37°.

It will be seen that the figures given for the store in Table II exceed those given for the fresh air school in Table I. This serves as an illustration of the way in which indoor air becomes unclean by use, the degree depending upon the extent of usage and the frequency of change. The basement referred to above had an elaborate installation for renewing its atmos-

* School Ventilation in New York City. C.-E. A. Winslow, American Journal of Public Health, Vol. 3, No. 2, 1913.

TABLE II.

SUMMARY OF ANALYSES OF AIR TAKEN FROM THE BASEMENT AND BASEMENT BALCONY IN A DEPARTMENT STORE, BOSTON. APRIL 3, 1914.

Hour.	Location.	Bacteria per cu. ft.		Dust particles per cu. ft.	Relative humidity.
		Gelatine at 20°.	Agar at 38°.		
11.00 a.m.	Intake of air washer	33	3	137,000	50%
11.30 a.m.	Washed air from washer	17	3	68,000	61
1.05 p.m.	Basement, N.E. corner	150	10	262,000	34
1.45 p.m.	Basement, N.W. corner	200	53	423,000	33
2.10 p.m.	Basement, south side center	223	67	476,000	29
3.00 p.m.	Balcony near stair well	160	23	321,000	35
3.30 p.m.	Balcony, S.W. corner	90	10	388,000	27

Temperature and Humidity Readings.

Hour.	Location.	Temperature.		Per cent. rel. humidity.	Remarks.
		Dry bulb.	Wet bulb.		
11.10 a.m.	Intake of air washer	54.5°	46.0°	50	Air taken in at roof
11.30 a.m.	Washed air from washer	58.5	51.5	61	Sample in duct
1.05 p.m.	Basement, N.E. corner	60.5	47.5	34	Near freight elevators
1.45 p.m.	Basement, N.W. corner	70.0	54.0	33	Near Exit CC.
1.55 p.m.	Basement, S.W. corner	70.0	53.5	31	Near Exit DD.
2.15 p.m.	Basement, south side center	72.0	54.5	29	Ladies' suit department
3.05 p.m.	Balcony, near stair well	73.0	57.0	35	North side
3.15 p.m.	Balcony, near restaurant	74.5	58.0	34	South side
3.30 p.m.	Balcony, S.W. corner	69.5	52.0	27	Near Exit DD.

phere and was fairly comfortable as to temperature and humidity. The ventilation system did not accomplish as perfect results, however, from the standpoint of air cleanliness. The figures given for dust and bacteria are slightly in excess of the average results given by Winslow for New York City schools.

During the routine of life in large cities there is probably no other place where the population mingles in closer personal contact, or under more abnormal conditions of ventilation, than in the cars of our transportation systems. This is the outcome of numerous causes, such as the rapid growth of certain communities, which overtaxes transportation facilities, the willingness to sacrifice comfort for speed, and the small amount of attention that has been given in years past to a

comprehensive study of existent conditions and means for their improvement.

The air in street cars is subject to unusual contamination from two sources, first, from the large number of persons occupying a given cubical space and second, from the streets over which the cars pass. The constant boarding of passengers brings upon the floor of the car a large amount of street dirt, which is dried and scattered about by the strong air currents. The rapid motion of the car over the streets lifts large volumes of coarse and fine material from the roadway and this is brought into the car in clouds when the speed is decreased and doors and windows are opened.

With the idea of obtaining information relative to the dust and bacteria content of air in street cars, some studies were made on the line of the Boston Elevated Railway Co. running between Harvard Square in Cambridge and Pleasant Street in Boston. The studies were in the nature of a preliminary investigation, and were made possible through the courtesies of Major-General Bancroft, President of The Boston Elevated Railway Co., Mr. M. C. Brush, Chief of Transportation, and Mr. C. H. Heil, Chief of Maintenance, to whom acknowledgment is made for the privilege of using the cars and equipment of the Company. The results are given so far as obtained, and are of interest as showing the conditions at the particular time and place at which determinations were made.

The line in question extends over four miles of the Boston Elevated Railway system, approximately half

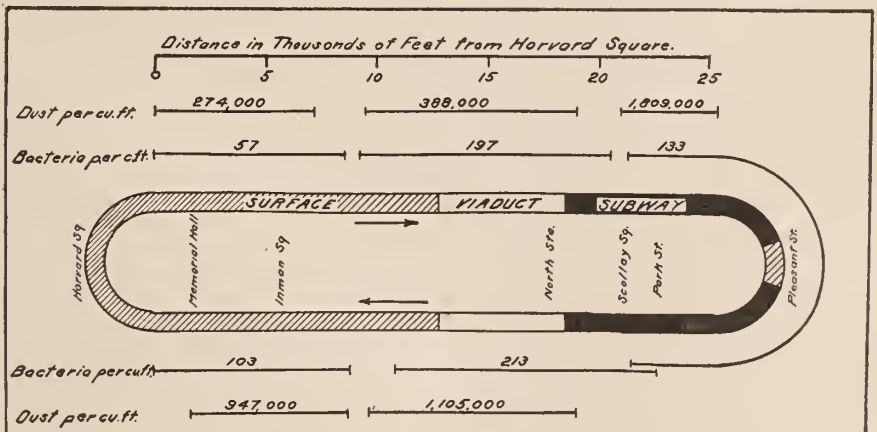


DIAGRAM SHOWING DUST AND BACTERIA PER CUBIC FOOT OF AIR ON STREET CARS.

March 17, 1914. " Damp Day.

Boston Elevated Ry. Co. Harvard Sq.-Pleasant St. Route.

Diagram 1.

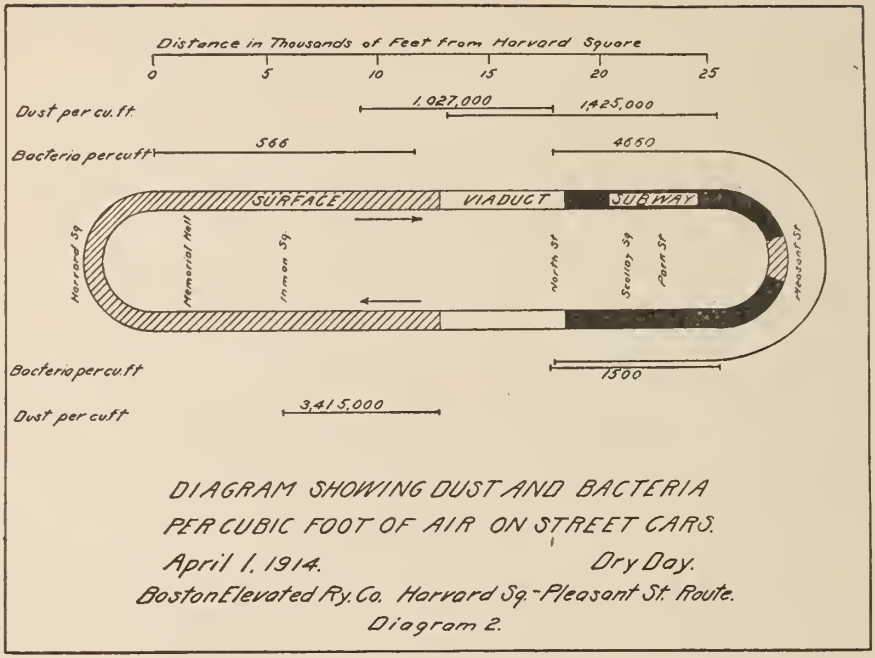


DIAGRAM SHOWING DUST AND BACTERIA PER CUBIC FOOT OF AIR ON STREET CARS.
April 1, 1914. Dry Day.
Boston Elevated Ry. Co. Harvard Sq.-Pleasant St. Route.
Diagram 2.

of the distance being surface line, the balance being divided between one of the Boston subways and a long viaduct passing over the Charles River and a portion of Boston. The cars in use were the large semiconvertible type, known as 4A2 and having closed vestibules and cross seats with a center aisle. Air was admitted to the cars by means of two deck-sash ventilators at either end, and by means of twelve curtain ventilators along the roof of the car, six of which were always open, the remaining ones closed. Samples of the air were collected at the center of the car. The results of analyses for dust particles and bacteria are given in Table III and are shown graphically in Diagrams 1 and 2. From eight to ten minutes was required for the taking of each sample, during which time the car was moving. The portion of the route over which the car moved during the taking of each sample is indicated in the diagram and in the tables the maximum and minimum numbers of passengers are given for each portion of the route.

Diagrams 1 and 2 show the route over which samples were taken, the character of the route at different points, and the approximate distances between stations. The figures for bacteria and dust appear above and below the representation of the route, and the line under each of them indicates the distance over which the sample was taken.

Comparison of the two diagrams shows a decided difference in the number of bacteria and dust particles on a damp and on a dry day, the latter

showing the higher results. The figures presented are much higher than those given for samples collected in other places mentioned in this paper. In one case the dust particles numbered 3,415,000 per cubic foot. This was in a section of Cambridge where a large force of men was engaged in removing the winter's accumulation of street dirt.

Judging from the rather limited number of determinations made, there is a tendency for the subway air to be less clean than the outside air over the streets. In general, higher results were obtained on portions of the route laying in the subway. The dust particles collected in the subway had a smaller average diameter and under the microscope were darker in color. The work of Soper in the New York subways has shown that a very considerable amount of metallic dust is present in subway air. This results from the wearing down of rails, wheels and brake shoes. Samples taken on the viaduct or in passing over it might be expected to give lower results on account of the greater purity of the atmosphere; but in passing from a rather dirty section of Cambridge in one direction, and from the subway in

TABLE III.

SUMMARY OF ANALYSES OF AIR

SAMPLES TAKEN IN CARS OF BOSTON ELEVATED RY. CO. HARVARD SQUARE—PLEASANT STREET LINE.

BACTERIA.

Section of route.	Bacteria per cu. ft.		Number of passengers.
	Gel. at 20°C.	Agar at 38°C.	
March 17, 1914.*			
Harvard Square to East Cambridge	57	43	7 to 35
Scollay Square to Pleasant Street and return	133	57	30
East Cambridge to Harvard Square	103	43	5 to 25
East Cambridge to Scollay Square	197	193	12 to 26
Park Street to East Cambridge	213	187	17 to 50
Outside air, Pierce Hall	33	17	—
April 1, 1914.†			
Harvard Square to East Cambridge	566	67	9 to 45
Pleasant Street to North Station	1,500	1,080	7 to 33
North Station to Pleasant Street and return	4,660	3,330	4 to 26
Outside air, Pierce Hall	117	10	—

*The streets on this day were damp from rain that had fallen a few hours previously.

†The streets on this day were dusty, following two days of dry weather and brisk winds.

TABLE III—*Continued.*

Dust Particles.

Section of route.	Dust particles per cu ft.	Number of passengers.
March 17, 1914.*		
East Cambridge to Scollay Square	388,000	35 to 67
Haymarket Square to East Cambridge	1,105,000	25 to 30
Harvard Square to East Cambridge	274,000	5 to 19
Scollay Square to Pleasant Street	1,809,000	4 to 26
East Cambridge to Memorial Hall	947,000	20 to 40
Outside air, Pierce Hall	133,000	—
April 1, 1914.†		
Viaduct to Pleasant Street	1,425,000	7 to 54
Viaduct to Inman Square	3,415,000	19 to 30
East Cambridge to North Station	1,027,000	26 to 37
Outside air, Pierce Hall	122,000	—

the other direction, with doors and windows closed, there was a considerable lag in the change of atmosphere within the cars.

In connection with Table III it will be noticed that the dust and bacteria content of the outside air at Pierce Hall, as registered on the days when samples were taken in the cars, was very much lower. This might be expected when consideration is given to the agitation surrounding the movements of street cars and the amount of dust and dirt that is brought into them by passengers.

The variations from day to day in the dust content of city air in a place removed from the influences of car traffic is illustrated by the figures given in Table IV. The results are for an eleven day period following shortly after April 1, 1914, the date of the street car observations given in Diagram 2. A wide range of weather conditions is covered by the period. Each sample examined was a composite one made up by collecting the dust at three or four different intervals during the day.

In general the figures in the table show that dust particles were most numerous when the streets were dusty and the wind movement great. Exceptions to this occurred on April 8, a foggy day with no wind, and on April 12 and 13, when there were high winds and fair weather. It is an observed fact that on quiet days with high humidity conditions a large amount of soot and dirt is deposited from city

* The streets on this day were damp from rain that had fallen a few hours previously.

† The streets on this day were dusty, following two days of dry weather and brisk winds.

TABLE IV.

TABLE SHOWING NUMBER OF DUST PARTICLES IN OUTSIDE AIR ON DIFFERENT DAYS. HARVARD UNIVERSITY, CAMBRIDGE, MASS.

Dust particles per cu. ft. at Pierce Hall.*	Date.	8 a.m.		4 p.m.		Remarks.
		Wind.	Weather.	Wind.	Weather.	
	Apr. 2			Light E.	Clear to rain.	Streets wet. Snow at night
	Apr. 3	Light W.	Cold Clearing	Brisk N.W.	Fair	Freezing during night
280,000	Apr. 4	Fresh N.W.	Cold Fair	Fresh W.	Fair	Streets dusty after noon
116,000	Apr. 5	Light S.W.	Cold Cloudy	Fresh S.W.	Clearing	Light rain up to noon
177,000	Apr. 6	Light W.	Cold Fair	Light S.W.	Fair	Streets somewhat dusty
158,000	Apr. 7	Brisk N.E.	Cold Rain	Light N.W.	Cloudy	Streets very muddy
226,000	Apr. 8	V. Light N.W.	Cold Foggy	Light S.E.	Mist	Streets muddy all day
91,000	Apr. 9	Fresh N.W.	Mild Clearing	Brisk N.W.	Partly cloudy	Streets became partially dried
113,000	Apr. 10	Brisk W.	Cold Fair	Fresh S.W.	Fair	Streets dusty
366,000	Apr. 11	Brisk S. to High	Mild Fair	High S.	Fair	Very dusty day Light rain in night
139,000	Apr. 12	Brisk S.W.	Mild Fair	High N.W.	Fair	Not much dust until noon. Gale in late P.M.
121,000	Apr. 13	Brisk N.	Cold Fair	Fresh N.W.	Fair	
109,000	Apr. 14	Fresh S.W.	Cold Fair	Light S.W.	Fair	

atmosphere. This may explain the result for April 8. The low results of April 12 and 13 were coincident with a shifting of the wind to northerly directions and a lowering of temperature. This followed a very light rain on the night of April 11. The movement of large volumes of air from northerly points nearly always results in a clearing of the atmosphere in Cambridge.

The factor of street cleanliness is a most important one in connection with the purity of the air within cars and along the streets over which they operate. It is only necessary to stand in the wake of a rapidly moving car on a dirty street to realize how effectually large quantities of dry material are stirred up, drawn after the car and diffused in the path of others. The

* Composite samples taken at different hours of the day.

proportion of coarse siliceous particles in the air is very large at such times. This contributes an element of danger if the theory is tenable that large, rough particles cause abrasion and irritation of the mucous linings of the respiratory passages, and so prepare an environment more favorable for the growth of infecting bacteria if they are present.

It is within the power of any municipality to aid in the problem of car ventilation and as a matter of public health this becomes a duty. If principal thoroughfares are kept well cleaned or oiled, much is accomplished by this act alone toward furnishing a supply of clean air for the cars passing over them. The problem is then confined to the adjustment of conditions within the cars.

A general inspection of all the results presented in this paper shows that although the dust and bacteria contents of air in different places, both indoors and out-of-doors, vary from day to day, there are distinct differences that mark the increased cleanliness of one place over another. These differences are measurable by the methods that have been described. Outdoor air may be said in nearly all cases to be cleaner than the same air after use in occupied places. Its initial purity will depend upon two things, the source from which it is taken, and the meteorological conditions prevalent at any particular time. It is on account of these influences that care should be exercised in the proper location of air intakes for buildings.

The dust and bacteria in the air of occupied places has been shown to vary greatly with the character of the place. The amount is, of course, influenced by a great many factors. The cleanliness of inside air may be judged by the total numbers of dust particles and bacteria present, regardless of whether the increase over the numbers in the incoming outside air is large or small. If the increase is large, measures should be taken on the inside to reduce the numbers, either by supplying a larger quantity of outside air or by eliminating dirty conditions within. If the incoming air is unclean it should be subjected to some cleansing process, or else the source of supply should be changed.

The methods which have been described for the collection of samples and their examination for dust particles and bacteria were employed to obtain the information presented in this paper. In some ways they have been proved to be very satisfactory, but their use has been accompanied by limitations.

So far as apparatus is concerned, nothing elaborate or very costly is required except the motor and pump that are necessary for exhausting the sample of air. The mechanical features of these have been perfected to such a degree that almost no trouble is experienced in their operation. The laboratory apparatus required, such as sampling tubes, is quickly and easily prepared, and the routine examination is made with standard microscopical accessories.

Another limitation in the method of sampling is the time required for each determination, usually from six to ten minutes. In a great many cases this

is advantageous, as the dust and bacteria content of air is liable to vary from minute to minute and the increased time interval gives a more representative sample. There are places, however, where a very short, almost instantaneous, period is needed in order to give the desired information. This was illustrated by the work on street cars where considerable portions of the route were covered during the taking of one sample. As a consequence the samples represented average conditions for a number of minutes. It would have been desirable to have taken more frequent samples.

The necessity of having to use an electrically operated apparatus is, however, a serious drawback. There are many places where samples are required in which it is not permissible to use a mechanically driven apparatus on account of the slight noise produced.

The counting of dust particles requires painstaking care. Every piece of apparatus that touches the sample must be scrupulously clean, as dust particles are everywhere in the air. If anything, even greater care must be exercised to guard against outside contamination than in bacterial work, for dust particles far outnumber bacteria in the air. The actual process of counting under the microscope is somewhat laborious, as every particle in the field down to the limit of visibility must be counted. As previously mentioned, this limit of visibility is a serious obstacle in the way of studying the fine particles in air. It may be that there are wide differences in this regard between samples of air. Any method that will take into account these smaller particles will be distinctly in advance of present procedure. Until information is secured in this unknown realm we shall never have the whole story concerning dust and its effects. The size of the visible particles should also be taken into consideration in order to obtain an idea of the percentage of coarse and fine particles. With the use of the present method for estimating the total number of particles this would be a very laborious procedure.

The above investigation was made in the Laboratory of Sanitary Engineering of Harvard University under the general direction of Professor George C. Whipple, and was made possible by funds kindly furnished by Mr. Ernest C. Dane of Brookline.

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POLICEMEN AS SANITARY INSPECTORS.

It is apparent that health departments are realizing more and more the opportunity for a close coöperation between their departments and the police departments. The health department of New York City has recently been experimenting with the use of policemen as deputy health officers. The commissioner, Dr. S. S. Goldwater, has made the following pertinent remarks with regard to this experiment which it is planned to extend. "Of all the city employees, the policeman, from the very nature of his duty and the circumstances under which he works, comes into the closest personal relation with the people. He should be the first to notice insanitary conditions and to do his part toward their betterment, either by personal effort or by reports to other city departments charged with the control of such matters. Already the moral guardian of the community,

he should keep an eye on its health and surroundings." Commissioner Goldwater has quite wisely urged the policemen to do this work rather as a friendly neighborhood adviser than as the stern impersonation of the law. Necessarily the policeman has limitations as a health officer but it is obvious that, in connection with nuisances particularly, he does not require a great deal of training. In New York City arrangements are under way to include in the regular curriculum of the training schools for new policemen a course of lectures and instructions in health matters. It is obvious that in a very large number of our health departments there are insufficient inspectors to make the necessary frequent inspections of their districts. The greater the number of inspectors the greater the number of nuisances that will be discovered. The size of the policeman's beat is necessarily very much smaller than the district covered by a sanitary inspector.

It is true that some police commissioners are opposed to using any of their officers for the work of the health departments. Some commissioners state that their objection is based on the fact that it takes too much of their time, and that their services are required in the more important work of protecting the lives and properties of citizens; also for the reason that such inspections should be made by persons skilled in the laws of sanitation. It is certainly true that an ignorant or over-zealous police officer might occasionally do something which might get the health department in hot water. While this cannot be gainsaid, it seems obvious that with coöperation between the departments and with the proper instruction of the police officers, that the benefits would far outweigh the disadvantages. The editor of this JOURNAL in an article which appeared a couple of years ago in these pages summarized the four main advantages of such a plan of coöperation as follows: (1) Increase of efficiency of public service in the amelioration and prevention of nuisances, and a resulting cleaner and more decent city. (2) Health departments able to devote more of their time to health work and to bring about healthier communities. (3) The development of coöperation between police and health departments. (4) No added cost to city. There does not seem to be any occasion to alter the conclusions. Coöperation is a good slogan for health departments and is apt to mean more than economy and efficiency.

CONCERNING THE ROCHESTER MEETINGS.

The attention of members of the American Public Health Association is again drawn to the fact that although the Association meetings at Rochester do not begin until Tuesday morning, September 7, they are cordially invited to be present at the open meeting of the Fifteenth Annual Conference of the Sanitary Officers of the State of New York which is to be held on Monday evening, September 6, at eight o'clock. There will be addresses by Dr. Hermann M. Biggs, Dr. W. C. Gorgas, Dr. G. W. Goler and others. (See page 18 of the Preliminary Announcement which has already been sent to the members.)

"RELATIVE STABILITIES" IN POLLUTED WATERS CARRYING COLLOIDS.*

ARTHUR LEDERER,
Sanitary District of Chicago.

Read before the Laboratory Section American Public Health Association, Jacksonville, Fla., December, 1914.

AS a rule, all river waters contain more or less colloidal matter in the form of very finely divided silt. Polluted waters also carry colloids of sewage origin mainly derived from the fecal matter.

Only recently has the importance of colloids been recognized in sewage disposal and water purification. We know that the colloidal matter in sewage affects the putrescibility of the liquid more than the heavier coarse suspended matter. The removal of the colloids by simple filtration—not biologic filtration—results in an improvement which is however much less than the one effected by biologic treatment† but far more than by settling. The study of colloids has given the science of chemistry a new aspect. Colloidal chemistry has explained some phenomema in nature as well as technology, heretofore not clearly understood. We differentiate between crystalloidal and colloidal state of matter. A very large number of inorganic substances, heretofore known only in the crystalloidal state, have been prepared in the colloidal. Some substances such as proteins, starch, gum, and glue are known in the colloidal form only. Suspensions of colloidal clay remain suspended in the water for days and weeks. The addition of electrolytes such as common salt, sodium sulfate, calcium sulfate, or sodium nitrate, accelerates sedimentation. The reason for this is (1) the electrostatic attraction between the colloids and the ions carrying the opposite electrical charge; (2) the removal of the water of the colloid. Hygroscopic electrolytes are, therefore, particularly efficient. Colloidal clay adsorbs aniline dyes such as methylene blue. By adsorption we understand the concentration of a dissolved salt on a surface due to difference in surface tension or electric potential. Clays also adsorb and retain other substances such as oils, fats, starch, proteins, certain inorganic dyes, all aniline and plant coloring matter, urine and fecal matter, putrid odors, and a large number of other substances. This property of adsorption has led Professor Rohland of Germany to develop his clay treatment of sewage and industrial waste waters. Adsorption is selective. An interesting study on this point has recently been made by Parker.‡

When applying methylene blue to waters carrying colloidal suspensions of clay, the dye is adsorbed by the clay and sedimentation occurs, leaving the liquid colorless. The sediment is blue. This adsorption may be only partial; it may take place quickly or slowly, all depending upon the quantity and the character of the colloidal mat-

* Arthur Lederer, Chemist and Bacteriologist, The Sanitary District of Chicago.
† Lederer, AM. J. PUB. HEALTH, Feb., 1912. ‡ Parker, J. Ind. Eng. Chem., Oct., 1914, p. 831.

ter present. The adsorption interferes seriously with the quantitative determination desired on the degree of putrescibility of the liquid. In other words, "relative stabilities" obtained in such waters by the methylene blue method cannot be correct. Spitta and Weldert in their original communication* advise the observation of decolorization of the sediment after adsorption takes place, though their observations are more of a qualitative nature and in such cases the exact time element is of less importance. In obtaining Phelps' "Relative stabilities," the time element is all important.

Until recently the writer disregarded the decolorization of the liquid in polluted river waters, and accepted the decolorization of the sediment as the criterion. Correspondence between the writer and Dr. F. E. Hale of the Mount Prospect laboratory, Brooklyn, N. Y., developed a difference of opinion regarding the reliability of this procedure. Doctor Hale held that the methylene blue once thrown out of solution is probably inert, and that, therefore, the decolorization of the liquid should be accepted as the sole index of the putrescibility. Doctor Hale's procedure consists in adding one cc. of methylene green solution at the beginning and continuously thereafter as demanded by adsorption until a slight color persists in the liquid. Decolorization of this was taken as the endpoint. Doctor Hale considers that this method gives good relative results, but probably does not represent absolute values. My aim was to obtain correct relative stabilities, while Doctor Hale's procedure aimed at relative results. In this respect our problem differed. Notwithstanding, I decided to investigate whether the observation of the decolorization of the sediment actually furnishes correct relative stabilities, and if not, which procedure would have to be followed. Jackson and Horton† recommend the use of as little methylene blue as possible, on account of its antiseptic properties, and the writer‡ in investigating the quantities recommended in the "Standard Methods" fixed the amount at 0.4 cc. of a 0.05 per cent. aqueous solution per 150 cc. bottle capacity. When working with waters carrying colloids, it is clear, of course, that there should always be 0.4 cc. or less of the coloring matter in solution, provided the sediment containing the precipitated coloring matter is actually inert. An excess of coloring matter in solution would interfere with obtaining correct results. If the coloring matter in the sediment retains its antiseptic qualities, even though to a lesser degree, it would still be impossible to obtain correct figures. The entire question depends, of course, upon the value of all methylene blue or other similar "relative stabilities" when applied to liquids other than sprinkling filter effluents.

Since the decolorization of the blue color coincides fairly closely with the elimination of the total available oxygen, I first determined the oxygen

* Spitta and Weldert; Mitt. kgl. Prüfungsanst. Wasserversorgung, Heft 6, p. 160.
† Jackson and Horton, J. Ind. Eng. Chem., Vol. 1, June, 1909.
‡ Lederer, Am. Jour. Pub. Health, Vol. 4, p. 241.

at the time of decolorization of the liquid and sediment as well. An artificial turbidity of 100 was imparted to a putrescible sewage-water mixture and a number of glass stoppered bottles were filled with this liquid. A number of these bottles were colored in the proper proportion with methylene blue, the others remained as "blanks" for the determination of the residual available oxygen. The results are given in the following Table I.

TABLE I.

ELIMINATION OF AVAILABLE OXYGEN IN TURBID WATERS ON APPLYING THE METHYLENE BLUE PUTRESCIBILITY TEST.

Serial No.	Date and time 1914.	No. of cc. 0.05% methy. blue added per 150 cc. capacity.	Color of supernatant liquid in 24 hours.	Time of decolorization of liquid in hours.	Time of decolorization of sediment in hours.	P. P. M. total initial available oxygen.	P. P. M. residual oxygen at time of decol. of liquid.
1.....	Apr. 14 11.00 a. m.	0.4	colorless	24	Sediment	23.3	10.5
		0.8	colorless	24	did not	23.3	10.5
		1.2	colorless	24	decolorize in	23.3	—
		2.0	blue	blue after 10 days	10 days	23.3	—
2.....	Apr. 15 10.30 a. m.	0.4	colorless	24	Sediment	23.5	8.8
		0.8	colorless	24	did not	23.5	8.8
		1.2	colorless	24	decolorize in	23.5	8.8
		2.0	blue	blue after 10 days	10 days	23.5	—
3.....	Apr. 20 11.00 a. m.	0.4	colorless	20*	88	20.1	0.5
		0.8	colorless	20*	105	20.1	0.5
		1.2	colorless	20*	112	20.1	0.5
		2.0	slightly blue	45	119	20.1	0.4
4.....	Apr. 23 11.00 a. m.	0.4	colorless	24	Sediment	22.1	4.7
		0.8	colorless	24	did not	22.1	4.7
		1.2	slightly	48	decolorize in	22.1	0.6
		2.0	blue	93	10 days	22.1	0.5
5.....	Apr. 27 11.00 a. m.	0.4	colorless	20*	52	18.7	0.5
		0.8	colorless	20*	61	18.7	0.5
		1.2	colorless	20*	70	18.7	0.5
		2.0	blue	45	76	18.7	0.4
6.....	Apr. 29 11.00 a. m.	0.4	colorless	20	100	21.0	2.9
		0.8	colorless	20	118	21.0	2.9
		1.2	colorless	20	127	21.0	2.9
		2.0	blue	45	142	21.0	0.7
7.....	Apr. 30 11.00 a. m.	0.4	colorless	20	127	21.4	5.0
		0.8		20	148	21.4	5.0
		1.2		20	169	21.4	5.0
		2.0		45	181	21.4	0.4

* Decolorized during the night, therefore estimated but roughly. The absence of the residual oxygen at the time of the decolorization of the liquid is of course due to the fact that the oxygen has not been determined at the exact time of decolorization.

These tabulated results indicate the following conclusions: A very serious mistake can be made by assuming that the decolorization of the sediment in silt-bearing waters is the correct measure of the "relative stability." Experiments 3, 4, 5, 6 and 7 show that the decolorization lags far behind the elimination of the available oxygen in such liquids or in other words the methylene blue, once adsorbed, is largely inert as an indicator. This bears out Doctor Hale's assumption. The adsorbed liquid is, however, not entirely inert, as otherwise the sediment would never decolorize. The fact that the sediment decolorizes only under prolonged ultra-anærobic conditions makes such an observation useless for quantitative purposes. Reliance on the decolorization of the liquid is equally doubtful because we cannot tell to what extent the decolorization is really adsorption. We can only be fairly certain of obtaining accurate "relative stabilities" if we knew that 0.4 cc. or less of the coloring matter per 150 cc. bottle capacity would remain in excess over the adsorption requirements, and that the adsorbed methylene blue was entirely inert. This cannot be insured under practical conditions, but remains a matter of chance. If more than 0.4 cc. of the coloring matter remains in solution, the antiseptic qualities of the dye would make itself felt and higher "relative stabilities" would result. The adsorption of the coloring matter seems to bear a definite relation to the amount of colloidal matter present, and indeed some German observers have recommended a quantitative procedure for determining colloids on this basis. The methylene blue test in waters carrying colloids is, therefore, of negative value only; *i. e.*, if the blue color of the liquid persists irrespective of adsorption, the "relative stability" is 100, or an excess of oxygen may be present.

A number of coagulants, such as freshly precipitated aluminum hydrate, magnesium hydrate, calcium carbonate and calcium oxide were employed to mechanically settle the colloids previous to introducing the coloring matter. The results were not sufficiently encouraging to follow this line of experiment. The addition of electrolytes to sewage, such as common salt did not accelerate the sedimentation sufficiently to be of practical advantage.

I am forced to conclude that it is useless to determine "relative stabilities" in turbid waters by the methylene blue method. This is unfortunate, since it robs us of a simple and convenient field procedure. To obtain the correct oxygen demand in such waters, the following procedure is requisite:

Determining the initial available oxygen. The free oxygen has to be determined on the spot. A sample for nitrate and nitrate determination can be preserved with chloroform and shipped to the laboratory. Three other samples should be collected carefully to avoid aëration. To one sample add either a certain quantity of fresh water (free of nitrites and nitrates) with a known oxygen content or a definite quantity of saltpeter.* Personally, I prefer to add saltpeter, since it is a

* Lederer, J. Infect. Dis., Vol. 14, p. 482.

much simpler procedure. The other two samples remain as originally collected. All of these samples are now incubated in closed bottles for ten days at 20° C. At the end of this incubation period, the residual available oxygen is determined in the samples devoid of saltpeter or additional water. The other sample is examined quantitatively for nitrites and nitrates. If free oxygen remains at the end of incubation the residual saltpeter oxygen need not be determined. All figures are referred to one liter of original river water. The nitrite nitrogen multiplied by 1.7 and the nitrate nitrogen multiplied by 2.9 express equivalents of oxygen. The initial available oxygen minus the residual oxygen expresses the biochemical oxygen demand. When the water is very badly polluted, the free oxygen sample need not be incubated for the reason that the free oxygen is certain to be absent after incubation. In connection with these incubations, it is important to keep in mind that the nitrites and nitrates are attacked while free oxygen is still present. As a rule, the nitrites and nitrates begin to be attacked when the free oxygen content is reduced by about 50 per cent.

MINUTES OF THE FORTY-SECOND MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

JACKSONVILLE, FLORIDA, NOVEMBER 30 TO DECEMBER 4, 1914.

First Session.

The Forty-Second Annual Meeting of the Association was called to order at the Seminole Hotel, November 30, 1914, at eight oclock p. m., by President William C. Woodward. Two hundred and seventy members were present.

The invocation was offered by the Rev. J. Lindsey Patton, of the Church of the Good Shepherd.

The address of welcome was given by the Honorable George M. Powell, Chairman of the Board of Bond Trustees, Jacksonville.

Responses were made as follows:

For the Dominion of Canada, Dr. Frederick Montizambert; for the United States, Dr. J. W. Trask; for the Republic of Cuba, Dr. Alfredo Dominguez.

The President stated that, owing to the present unsettled condition of Mexico, no representative had been able to attend. He read the following letter from Dr. Eduardo Liceaga, for many years president of the Federal Board of Health, Mexico:

"The present circumstances in my country will not permit me to assist in the annual meeting of the Association in Jacksonville but I ask you to consider me as an active member of the Society. My enthusiasm for the Association is the same as for the past thirty-three years, and I beg of you to tell this to all our old and excellent friends who are assisting in the meeting.

"I remain as ever,
"E. Liceaga"

The First Vice-President, Dr. J. F. Anderson, then took the Chair and introduced the President who delivered the presidential address, "A Plea For Efficiency and Economy in the Maintenance and Operation of Private Agencies Working for the Conservation and Promotion of Public Health."

On motion, the meeting adjourned.

Selskar M. Gunn,
Secretary.
Wm. C. Woodward,
President.

Second Session.

The meeting was called to order at 8 p. m., December 1, 1914, by the President. The minutes of the 1913 meeting having been published in the Journal of the Association, reading was by unanimous consent dispensed with.

Dr. Charles Hatfield presented a resolution with regard to holding a National Public Health Congress in 1916. Resolution was referred to the Executive Committee.

The following papers were read:

The Federal Meat Inspection Service, and Sanitation of Packing Houses under Its Supervision, by George H.

Shaw, Sanitary Engineer, U. S. Department of Agriculture, Bureau of Animal Industry.

Sickness Insurance and Its Relation to Public Health, by B. S. Warren, M. D., U. S. Public Health Service Sanitary Advisor, United State Commission on Industrial Relation, Washington, D. C.

Necessity of Coördinating the Volunteer Public Health Work, by Frederick R. Green, M. D., Secretary, Council on Health and Public Instruction, American Medical Association, Chicago, Ill.

Smallpox Epidemic at Niagara Falls, by Linsley R. Williams, M. D., Deputy Commissioner of Health, State Department of Health, New York.

Educational Work on Sanitary Food Values in New York City, by Donald B. Armstrong, M. D., Director, Department of Social Welfare, New York, Association for Improving the Condition of the Poor.

Registration of Communicable Diseases with Special Reference to Out-of-Town Cases, by F. M. Meader, M. D., Director, Division of Communicable Diseases, New York State Department of Health, Albany, New York.

Preventable Accidents Following Vaccination, by W. F. Elgin, M. D., Glenolden, Pa.

The following papers were read by title:

The Relationship of the Visiting Nurse to the Public Health Campaign, by Ella P. Crandall, Executive Secretary, The National Organization for Public Health Nursing, New York City.

Health and Economic Results of Rural Depopulation and Abnormal Increase of Cities, by Peter H. Bryce, M. D., Chief Medical Officer, Department of the Interior, Canada.

On motion the meeting then adjourned.

Selskar M. Gunn,
Secretary.
Wm. C. Woodward,
President.

Third Session.

The meeting was called to order at 2 p. m., Dec. 2, with the President in the Chair. The President pointed out that this meeting was to be a joint session with the National Mouth Hygiene Association and introduced Dr. Harvey W. Wiley, the president of that organization, who thereupon took the Chair.

The following papers were then read:

The Place of Mouth Hygiene in the Personal and Public Health Movement, by William G. Ebersole, M. D., D. D. S., Cleveland, Secretary and Treasurer, National Mouth Hygiene Association.

The Dental Clinic as a Community Investment, by Edward F. Brown, Secretary of the Association for Improving the Condition of the Poor, New York, City.

Dr. W. A. Evans then took the Chair.

The following papers were then read:

Popular Education in Mouth Hygiene through Organized Publicity —through the Press, the Platform, the Motion Picture and the Exhibit, by Myron Jermain Jones, M. A., Cleveland, Executive Director, the National Mouth Hygiene Association.

Diet and Dentistry, or the New Gospel of Health According to the

Oral Hygienist, by Harvey W. Wiley, M. D., Washington, President, National Mouth Hygiene Association.

On motion the meeting adjourned.

SELSKAR M. GUNN,
Secretary,
WM. C. WOODWARD,
President.

FOURTH SESSION.

The meeting was called to order at 8 p. m., December 2, 1914, with the President in the Chair. The Secretary read the report of the Executive Committee, including the report of the Secretary and Editor, the Treasurer, and the Committee of Seven.

REPORT OF THE EXECUTIVE COMMITTEE.

The Executive Committee begs to transmit to the Association the following resolutions and recommends their adoption:

1. That the Association adopt a permanent badge for its members, and that the Executive Committee be authorized to appoint a committee to select the design for such a badge and to arrange for their manufacture.

2. That the report, of the Committee of Seven, containing the reports of the Treasurer, Secretary, and Editor, be approved and that their adoption by the association be recommended and that the Executive Committee thank Professor Gunn and Dr. Frankel for their services.

3. WHEREAS, the opinion has been expressed by the President and many members of the American Public Health Association to the effect that it is desirable that all approved national associations dealing with various aspects of public health be brought into closer coöperation; and whereas a National Public Health Congress in which all such associations can participate, should work toward the desired end: Be it resolved, that the American Public Health Association is in favor of holding a National Public Health Congress at some time in the year 1916; that it is desired that all approved national organizations dealing with public health problems participate in this Congress; that so far as possible the Congress shall consist of the holding of the regular annual meetings of such societies at the same time and place; that a temporary organization to arrange for the general meetings of the combined groups be effected; and that the Executive Committee be given authority to formulate a plan for such a Congress.

4. That the Constitution and By-laws be amended by striking out everything in the Constitution after Article 1, Sec. 1, and by striking out the entire body of the By-laws.

5. That the Executive Committee be authorized to appoint a special committee to draft a new Constitution and By-laws to replace so much of the Constitution and By-laws as it is proposed to strike out, the committee to present its report at the next Annual Meeting; that a copy of the proposed changes be sent to each member in good standing, at least, thirty days before the next Annual Meeting; and that each Section be urged to take such action as may be necessary for the adoption of desirable

changes in the Constitutions and By-laws of the Sections next year.

6. That the Committee of Seven be given authority to coöperate with the Central Committee on National Health Organizations, or other bodies engaged in public health work, should occasion arise before the next Annual Meeting of the Association.

SELSKAR M. GUNN,
Secretary.
WM. C. WOODWARD,
Chairman.

REPORT OF THE COMMITTEE OF SEVEN TO THE EXECUTIVE COMMITTEE.

The Committee of Seven has held four meetings since the Colorado Springs Meetings of the Association.

The Committee begs to state that since the Colorado Springs Meeting 351 new members of the Association have been elected as provided for in Chapter 5 of the By-Laws as amended December 6, 1911.

During the year the following motions have been passed by the Committee:

October 25, 1913.—"That the 1914 meetings of the American Public Health Association be held in the week commencing Monday, November 23, 1914."

"That the request of Professor Bartow for an appropriation to carry on the work of the Committee on Standard Methods of Water Analysis be refused, and that the Secretary notify Professor Bartow that the present funds of the Association prohibited the appropriation of money for this purpose."

"That the President be requested to appoint delegates to the National Conservation Congress, in compliance with the request of Mr. Thomas R. Shipp, the Secretary of that Congress."

"That the President be authorized to appoint a committee to study the Constitution and By-Laws of the Association with regard to their simplification."

"That the President be requested to communicate with the chairman of each section for the purpose of appointing a special committee to take up the question of what the Association can do to bring about an improved personnel of health boards and health officers, inspectors, etc."

December 27, 1913.—"It was moved and seconded that the resignation of Doctor Farrand as Treasurer of the Association be accepted with regret, to take place not later than January 31, 1914, or such date prior to that as he transfers the books and moneys of the Association to his successor."

"That the resignation of Doctor Farrand as editor of the JOURNAL be accepted with regret to take place not later than January 31, 1914."

"That Mr. Selskar M. Gunn be appointed editor of the JOURNAL and empowered to transfer the business of the JOURNAL and of the Association to Boston and that he make all such arrangements as may seem to him necessary and advisable for the further conduct of the JOURNAL and of the Association."

"That Doctor Lee K. Frankel of the Metropolitan Life Insurance Company be elected Treasurer of the American

Public Health Association, and that he commence the active duties as Treasurer as soon as the present Treasurer, Doctor Livingston Farrand, transfers to him the funds of the Association which is to be done on or before February 1, 1914."

"That a committee consisting of the chairman, Messrs. Folks and Gunn be authorized in the event of Doctor Frankel's refusal to accept the Treasurership to appoint some other person for this position."

"That the price of the JOURNAL be raised to $3.00 per year, and individual copies to 30 cents each, and that the change of price be put into effect at the convenience of the editor."

"That Doctor Lee K. Frankel, the Treasurer, be authorized to continue the present account of the Association, to open such new accounts as he may see fit and to transact all business as pertains to the office of Treasurer."

January 29, 1914.—"That it is the sense of the Committee of Seven that a properly supervised commercial exhibition can with advantage be held in connection with any scientific exhibition that the local committee may see fit to prepare."

May 25, 1914.—"That the dates of the Jacksonville meetings be changed from November 24 to 28 to November 30 to December 5."

"That the Committee of Seven felt that it had no power to authorize the formation of a new section of the Association as was desired by the Association for the Prevention of Pollution of River and Waterways, but that the Association would be very glad indeed to receive the members of this organization as members of the American Public Health Association and have them identify themselves with the Section that they are particularly interested in."

July 17, 1914.—"That Mr. Gunn be granted a vacation from August 25 until early in October with pay."

July 24, 1914.—"That the Treasurer be authorized by the Committee to transfer the accounts of the Association from the Lincoln Trust Company of New York to the Paul Revere Trust Company of Boston, and the Treasurer be also authorized to transfer the loan now being made by the Lincoln Trust on the Savings Bank Collateral to the Paul Revere Trust."

October 8, 1914.—"That in view of the authorization of the Committee on Trust Funds, the Committee of Seven of the American Public Health Association by virtue of the authority given them by the Constitution, hereby voted to authorize the Treasurer to pay up the loan of $2,500 due the Paul Revere Trust Company and that the balance of the Trust Funds left after paying the loan be transferred to the drawing account of the Association at the Paul Revere Trust Company of Boston."

November 16, 1914.—"That Mr. E. A. Moree of the State Charities Aid Society be appointed special Publicity Agent in connection with the Jacksonville Meetings and that his expenses, to and from New York to Jacksonville, be paid from the Association Funds."

The Committee reports that the

Treasurer's report appended herewith has been audited by Haskin & Sells, Public Accountants, and Harvey S. Chase, Public Accountant, and found correct.

November 30, 1914.

The committee begs to report that a sub-committee of audit has examined the cheques and accounts and the statements of the certified accountants, and begs to report that said cheques and vouchers, correspond to the reports of the accountants.

Selskar M. Gunn,
Secretary.
Wm. C. Woodward,
Chairman.

On motion the report of the Executive Committee including its resolutions and the recommendations of the Secretary and Editor was adopted.

The following papers were then read:

A Campaign Against Quacks, by W. A. Evans, M. D., Chicago, Ill.

The Enforcement of the Tennessee Anti-Narcotics Law, by Lucius P. Brown, State Food and Drug Commissioner, Nashville, Tenn.

The Independent Spirit of the Dope User and What Are We Going To Do About It, by Donald McCaskey, M. D., Witmer, Pa.

The Curse of Narcotism in America, by Miss Jeannette Marks, South Hadley, Mass.

The following papers were then read by title:

The Present Status of Habit-Forming Drugs, by L. F. Kebler, Chief, Drug Division, Bureau of Chemistry, Washington, D. C.

The Genesis of the International Movement for the Mitigation of the Opium Evil, by Hamilton Wright, M. D., Cambridge, Mass.

After discussion, a resolution regarding the use of habit-forming drugs was presented by Dr. C. E. Terry.

Under the By-Laws, the resolution was referred to the Executive Committee.

The following paper was then read:

The Prevalence of Occupational Factors in Disease and Suggestions for their Elimination, by E. R. Hayhurst, M. D., Chief, Survey of Occupational Diseases, State Board of Health, Columbus, Ohio.

The following papers were then read by title:

The History and Development of Industrial Hygiene with Special Reference to the United States, by George M. Kober, M. D., Washington, D. C.

Health Insurance, by John B. Andrews, Ph. D., Secretary American Association of Labor Legislation, New York City.

On motion the meeting adjourned.

Selskar M. Gunn,
Secretary,
Wm. C. Woodward,
President.

Fifth Session.

The meeting was called to order at 9 a. m., December 3, 1914, by the President. The Secretary reported that the Executive Committee recommended the adoption of the resolution introduced by Dr. Terry, as follows, and it was adopted.

Whereas, The use of habit-forming drugs, such as opium, cocaine, chloral

and similar drugs, in this country is increasing with such rapidity as to have assumed the proportions of a national evil and—

WHEREAS, The effects of these drugs are admittedly prejudicial to health, community welfare, and race development, and—

WHEREAS, It is evident at the present time that there exists no widely efficient control of the evil—federal, state, municipal, or otherwise,

Therefore, be it resolved, That the President be empowered to appoint a standing committee of five members which shall be known as the Committee on Habit-Forming Drugs, and whose duties shall be as follows:

(1) The collection of all available accurate data relative to narcotism in the United States, in connection with which the Committee will endeavor to learn as far as may be practicable the attitude of the newspaper press with respect to advertisements of preparations of such drugs, coöperating in such inquiry with the American Newspaper Publishers Association in so far as may be deemed expedient.

(2) The preparation of a summary of existing legislation in this country.

(3) The preparation of a full report, to be presented at the next annual meeting of the Association, which shall have as its objects the presentation of existing facts; recommendations for the control of the present alarming situation as the Committee may deem advisable, and the outlining of such laws as shall control the importation, production, manufacture, sale, and distribution of habit-forming drugs.

The following papers were then read:

The Negro Health Problem in Southern Cities, by William F. Brunner, M. D., Savannah, Ga.

The Negro Health Problem in Rural Communities, by A. G. Fort, M. D., Augusta, Ga.

The Negro Health Problem, by L. C. Allen; M. D., Hoschton, Ga.

The Negro as a Problem in Public Medical Charity, by Lawrence Lee, M. D., Savannah, Ga.

The Influence of a Large Colored Population on the General Death-Rate, by Ernest C. Levy, M. D. Health Officer, Richmond, Va.

Syphilis Among Insane Negroes, by S. S. Hindman, M. D., Georgia State Sanitorium, Milledgeville, Ga.

Practical Remedial Measures for the betterment of the Hygienic Conditions of the Negro, by M. L. Graves, M. D., Galveston, Tex.

After discussion, the meeting was adjourned.

SELSKAR M. GUNN,
Secretary.
WM. C. WOODWARD,
President.

SIXTH SESSION.

The meeting was called to order at 9 a. m., December 4, 1914, by the President. The Secretary reported that the Executive Committee submitted the following resolutions to the Association recommending that they be adopted.

1. That the American Public Health Association desires to extend to Dr. Stephen Smith, one of the first organizers of the American Public Health Association in 1872, its congratulations on his continued enjoy-

ment of health, and its joy and pleasure in being able to illustrate the outcome of his efforts and those of his colleagues in the present prosperity of the Association, which has expanded till it represents the public health interests of four countries and of 125,000,000 people. The Association wishes Doctor Smith all the happiness which the contemplation of a life spent in public service for the amelioration of the sufferings of mankind may bring.

2. That the American Public Health Association desires to extend to Dr. E. Liceaga its regrets at the announcement of his withdrawal from the active duties as President of the Federal Bureau of Health of Mexico and to express its sense of the loss which the Association and the public health interests of Mexico and of the American continents will experience at the retirement of Doctor Liceaga from the oversight of the responsible work entailed upon Mexico through its geographical position. The Association wishes for Doctor Liceaga all the happiness and contentment which may come to him as he looks back over a long life spent in the public service of a people he has loved so well and for whom he has spent his life.

The following resolutions submitted to the Executive Committee by the Section on Vital Statistics were reported to the Association by the Executive Committee, with the recommendation that they be passed:

3. Whereas, The active coöperation of the Federal Bureau of the Census with state departments of health and registration offices has been an important factor in promoting the extension of the registration area for vital statistics, thus providing a broad basis of fact indispensable for constructive public health work,

Be it resolved, That the American Public Health Association hereby heartily approves of this coöperation in the past and directs its Executive Committee to do whatever it can to assure the continuance and promote its efficiency in the future, by appointing a special committee to work for the extension of the area within which all deaths and births are registered and for the increased utility of these returns to the cause of public health.

That hospitals having competent pathologists should take the necessary steps to obtain autopsies. That a copy of this resolution be sent to the Secretary of the American Hospital Association and the Secretary of the American Medical Association.

The Executive Committee reported that more than ten members of the Association had petitioned for the formation of a section on industrial hygiene, and recommended the formation of such a section under the name, Section on Individual Hygiene. The resolution was adopted.

The Secretary then presented the report of the Advisory Council.

Meeting of the Advisory Council.

The Advisory Council of The American Public Health Association was called to order by the Secretary at 5 p. m. at the Seminole Hotel, December 3, 1914. The Secretary read the roll call, and 48 members were present.

Dr. H. D. Holton was elected chairman, and Dr. A. W. Freeman secretary. The following members of the Association were nominated by ballot for the offices stated immediately preceding their respective names to serve for the terms provided by the Constitution;

President, Prof. W. T. Sedgwick, of Boston; *first vice-president*, Dr. C. J. Hastings, of Toronto; *second vice-president*, Dr. Juan Guiteras, of Havana; *third vice-president*, Dr. C. E. Terry, of Jacksonville; *Treasurer*, Dr. Lee K. Frankel, of New York; Members Executive Committee; Dr. John F. Anderson, of Washington; Dr. J. H. Landis, of Ohio; Dr. Alfredo Dominguez, of Havana.

Invitations for 1915 meeting were received from Albany, N. Y.; Baltimore, Md.; Buffalo, N. Y.; Chicago, Ill.; Charleston, S. C.; Cincinnati, Ohio; Columbus, Ohio; Denver, Col.; Galveston, Tex.; Indianapolis, Ind.; New York, N. Y.; Oakland, Cal.; Riverside, Cal.; Rochester, N. Y.; San Francisco, Cal.; Saratoga Springs, N. Y., St. Louis, Mo.; Springfield, Mass.; Toledo, Ohio; and Toronto, Ont.

On ballot it was voted that Rochester, N. Y., be recommended to the Association as the place of the 1915 meetings.

Dr. Edwardo Lieeaga was recommended for Honorary Membership.

HENRY D. HOLTON,
Chairman.
ALLEN FREEMAN,
Secretary.

It was voted that the report of the Advisory Council be adopted.

The following resolutions by the Executive Committee, were reported to the Association with recommendation that they be adopted.

1. That a special committee of the American Public Health Association be appointed to prepare and submit at the next annual meeting a draft of the Standard Methods of the American Public Health Association for Plumbing and House Drainage.

2. That a special committee of the American Public Health Association be appointed to prepare and submit a report in full detail at the next annual meeting, giving specimen forms, for a complete system of uniform administrative accounting adapted to health department work.

The above resolutions were adopted.

In accordance with notice given at the Colorado Springs Meetings, the following change in the Constitution was presented:

That Section 7, Article 3, be amended by adding the words "or interested in" after the words "engaged in."

The change in the Constitution as presented was adopted.

Dr. Louis I. Dublin, Chairman of the Committee on Morbidity Statistics, presented the report of the committee. It was voted that the report be received and the Committee continued.

The report of the Committee on Cold Storage was presented. It was voted that the report of the Committee be recorded, but not at present adopted, and that the Committee be continued.

The following papers were then read:

Life Extension, by Professor Irving

Fisher, of Yale University, New Haven, Conn.

The Protection and Maintenance of the Public Health During and Subsequent to a Great Conflagration, by William C. Hanson, M. D., State Department of Health, Boston, Mass.

A Rural Sanitary Survey, and What It Reveals, by Oscar Dowling, M. D., President, Louisiana State Board of Health, New Orleans, La.

The following papers were read by title:

The Relation of the City to the Milk Supply, by Nathan Strauss, New York City.

A Proposed American Public Health Association Course of Study for Health Officials and Others Interested in Public Health Work, by F. D. Bell, New York City.

The Sanitation of Vera Cruz, Mexico, by James T. B. Bowles, New York City.

It was voted that the Association express its appreciation of the public-spirited and disinterested services rendered by Mr. E. A. Moree of New York in connection with the publicity work of the Jacksonville meetings.

SELSKAR M. GUNN,
Secretary.
WM. C. WOODWARD,
President.

CLOSING SESSION.

The meeting was called to order at 5.30 p. m., December 4, by the President. The Secretary then read reports from the Sections announcing the election of the officers, named as follows:

Laboratory Section.

Chairman, Prof. C.-E. A. Winslow,
Vice-Chairman, Prof. H. W. Conn,
Secretary, Dr. D. L. Harris,
Recorder, Dr. A. W. Freeman,

Vital Statistics Section.

Chairman, Dr. C. L. Wilbur,
Vice-Chairman, Dr. W. A. Plecker,
Secretary, Dr. Louis I. Dublin,

Section of Public Health Officials.

Chairman, Dr. J. H. Landis,
Vice-Chairman, Dr. W. S. Rankin,
Secretary, Dr. E. C. Levy,
Recorder, Dr. A. S. Fell,

Sanitary Engineering Section.

Chairman, Mr. Geo. W. Fuller,
Vice-Chairman, Prof. Geo. C. Whipple,
Secretary, Dr. H. D. Pease,

Sociological Section.

Chairman, Dr. H. E. Dearholt,
Vice-Chairman, Dr. Lee K. Frankel,
Secretary, Dr. W. F. Snow,

The following resolution was then adopted.

Resolved, That the American Public Health Association desires to express its appreciation of, and thanks for the splendid reception which has been extended to it as an official body and to its individual members and their friends by the city of Jacksonville, the City Council and by its Board of Health. It desires especially to compliment the City Health Officer, Doctor Terry, as chairman, and the members of the local committee of arrangements for the splendid facilities given the Association for prosecuting its work.

In the name of the ladies of the Association the members desire to extend their thanks to the ladies of Jacksonville for the constant attention and courtesies extended to the visiting ladies.

The Association further desires to express its appreciation of the able manner in which the press of Jacksonville and the public press of the country generally have given publicity to the proceedings of the Association.

Finally the Association cannot fail to recognize the existence of general interest on the part of the federal, state, provincial and municipal governments, in so generally sending their officials to coöperate in the work of the Association, so important to the health interests of the four countries forming the Association.

The following telegram was received from President-elect William T. Sedgwick:

"Surprised, gratified, and honored by your kind action. Can succeed only with support of all."

It was moved by Dr. P. H. Bryce and seconded by Dr. Oscar Dowling, the vote being put by Dr. Charles Hastings, that a vote of thanks be extended to the retiring president, Dr. William C. Woodward, for the manner in which he had conducted the meetings. This was adopted by a standing vote.

The Association then adjourned,

Selskar M. Gunn,
Secretary.

Wm. C. Woodward,
President.

REPORT OF THE SECRETARY AND EDITOR TO THE COMMITTEE OF SEVEN AND THE COMMITTEE ON JOURNAL.

It has seemed to me advisable to make a formal report this year of the work done by me and my staff since the Colorado Springs Meeting. While it might be better to make two separate reports with respect to my two offices, it appears to me really necessary to present a combined report on account of the present close interrelation of my two positions and in order that you may obtain a general idea of the whole situation.

If agreeable to you and to the Executive Committee, I would respectfully suggest that this report be referred to the Association as a whole, as I believe that the members are to a considerable extent ignorant of the general problems and financial situation of the Association.

The Association.

Since the Colorado Springs Meetings we have taken in 351 new members. This is a record of 232 more than has ever been taken in between meetings and is an encouraging sign. The credit for this marked increase belongs to Mr. Frank H. Canaday, the business manager of the Journal, and to the

coöperation of a number of our members. The prospects for even greater increases are good, as the publicity work which we have been doing for the past two years has made the Association known to many who were ignorant of its very existence. The growing increase of interest in public health and the constant recruiting of trained men and women to the public health field should help very materially in the future. More and more people who were interested only in one branch of the work, such as the prevention of infant mortality and tuberculosis, are recognizing that they must take cognizance of many aspects of public health in order to bring about their cherished hopes in their particular field. The total membership on November 21, was 1,350 in good standing.

Dr. Wm. C. Woodward, at the Havana meeting in 1911, presented a report as Secretary which emphasized some of the defects of the Association. Some of these have been rectified, but his main contention that the Association was of little significance between meeting times is still true. The question that I should like to put before you is this: Is the Association desirous of continuing as in the past by having an annual meeting and publishing a journal and doing nothing else, or does the Association want to take a more prominent place in the four countries and through its officers build up an organization that will be able to make itself felt every day in the year if need be? Do the members want the Association to become a great active health organization, assisting in the formation of affiliated state health association, helping to bring about desirable legislation in federal, state and municipal governments, advising and assisting communities and individuals engaged in public health work, aiding in correlating and coördinating much of the public health effort which is being attempted? I do not presume to answer these queries, but I believe that the time has come when the Association must face the question and the possible formation of another organization which will do these things, if the American Public Health Association does not want to undertake them. The Central Committee on National Health Organizations, composed of representatives from a number of national public health organizations, has recently been formed and is engaged at the present time in making a thorough study of existing national organizations which are engaged in some phase of public health work. Their report should be made before many months have elapsed. It is not possible to foretell their recommendations. If it should be deemed advisable to have an organization capable of carrying on the work outlined generally by me, are the members of this Association desirous that the American Public Health Association should be the organization to undertake it?

These thoughts are offered in no controversial spirit but with the earnest belief that here indeed is a matter of great import to the Association. I hope that this meeting will not disband without having given the matter proper

consideration and arrangements made for such steps as may seem desirable in the future.

If the Association should attempt any such program, an increased budget would have to be met, the executive staff would have to be reorganized and augmented. Your Secretary assures you that he is not endeavoring to create a new position for himself and would gladly relinquish his present position if the Association desired it.

The Journal.

With the departure of Doctor Farrand for the University of Colorado and his resignation as editor, you were kind enough to ask me to serve as editor and abolished the position of managing editor, which I had previously held. With this change it was deemed advisable to do away with the New York office and to transfer all of its activities, as far as the JOURNAL was concerned, to Boston. This was done early in the year, and Dr. P. P. Jacobs, who had so faithfully served as business manager, relinquished this position. Arrangements were made to have the second class entry of the JOURNAL transferred to the Boston office. The following gentlemen kindly consented to serve in the capacity of advisory editors: Dr. Charles V. Chapin, Dr. Livingston Farrand, Prof. George C. Whipple, Dr. Wm. C. Woodward, Dr. Peter H. Bryce. Dr. H. L. Mann was appointed as business manager, at a salary of $125.00 a month, and held this position until July, when Mr. Frank H. Canaday succeeded him at a salary of $75.00.

Circulation.

Constant efforts have been made to increase the circulation of the JOURNAL and although the progress has been slow, it has been positive. We had 1611 names on the paid circulation list for the November issue, an increase of 300 since January. Last year our paid circulation list was apparently larger, but this was due to two large gifts which enabled us to send the magazine to 1,400 people, as a gift. With the expiration of these donated subscriptions, efforts were made to keep the names on the lists by having the individuals take out subscriptions themselves. The results were not very satisfactory. Many efforts have been made to increase our subscriptions from health officers, and several letters, special printed circulars, etc., have been sent but with exceedingly poor results. I am of the opinion that until the health officers of the country receive adequate remuneration for their services they will not be willing to join the Association and subscribe to the magazine. Many have written in saying as much, and it would be a further waste of money and time to attempt to entreat them at the present time. It must be remembered, also, that health officers are able to get free of all cost a great deal of public health literature from the federal government services, state and municipal departments of health, etc. The amount of such available material is large and ever increasing. This fact is of considerable significance and makes it the more difficult to interest the poorly paid health official in a magazine which he will have to pay for.

Volume III (1913), had 1,384 pages, and it is certain that the present volume will be about the same. These figures are exclusive of the advertising pages.

In the fourteen issues published since the Colorado Springs Meeting, there have appeared 112 articles read at Colorado Springs, 27 original articles, 10 articles read before the Massachusetts Association of Boards of Health, making a total of 149 articles, or more than 10 to each issue. Furthermore, 10 committee reports have been published, 33 books reviewed and 52 health department reports abstracted. There have also appeared 21 editorials, 215 Public Health Notes, 212 Health Department Notes, 71 Industrial Hygiene and Sanitation Notes and 670 articles on various phases of public health have been noted in the section devoted to Current Public Health Literature. The amount of time given to the various note and review sections is considerable, but as far as I can learn these divisions are among the most popular and interesting in the magazine. It is hoped to develop these sections further and also to open up some new ones, such as a Question Box and sections devoted to communications and personal notes.

Advertising.

With a scant circulation, advertising comes hard. However, our growth in this direction has been constant and healthy. In the year ending August 31, 1914, we took in $1,886.48 from advertisers as against $931.34 for the previous year—an increase of $955.14. This was accomplished by raising the rates and by getting new advertisers. The war has caused us to lose temporarily some advertising but we expect it back eventually. We have a number of good prospects and the advertising situation is better than ever before, although far from what it might be.

A Serious Criticism.

One of the most serious criticisms that can justly be directed against the JOURNAL is the inevitable delay that must arise in publishing many of the papers read at the annual meeting. For example, some of the papers read at Colorado Springs Meeting appeared in the November, 1914, issue. No one realizes the injustice to the authors concerned more keenly than your editor and he feels that arrangements must be made to obviate this difficulty in the future. With five sections in addition to the meetings of the General Association it becomes an impossible financial burden to print all the papers read in the first few months after the annual meeting and then have funds to publish the magazine until the next meeting comes around. Furthermore, on account of the large number of manuscripts on hand after a meeting, your editor is unable to invite contributions to the magazine on subjects of current interest on account of the inability to pay for printing them. Also not a few manuscripts have had to be returned to authors with regrets for the same reason. It is encouraging to note that writers and investigators on public health

topics are coming more and more to recognize that the JOURNAL is the proper place for their contributions. Two years ago it was rare to receive any voluntary communications. Now every week manuscripts are received. In order to obviate this grave difficulty, which in my opinion is seriously retarding the development and advance of the JOURNAL, and with the idea of giving fairer treatment to authors of papers read at the annual meetings, I would respectfully suggest that the editor be given authority to notify authors whose papers cannot be printed within a reasonable time so that the author can have the opportunity of having his article printed in some other journal, without delay, and that a one-page abstract be prepared by the author, if he desires, and published in the JOURNAL as soon as possible after the meeting has taken place. If this were done it would mean a great deal to your editorial staff and would be a step in the direction of the self support which we are striving for.

Your editor feels the JOURNAL is capable of improvement in practically every direction, but believes that real progress has been made during the past year. Self support is not in immediate sight, but from a careful analysis of income and expenses it is apparent that the coming year, if conducted along lines similar to the past two years, should show a great improvement. I feel confident that in place of a deficit of between $4,000 and $5,000 which has had to be met during the past two years, that the coming year should only need less than $2,000 to be raised in addition to our regular income.

The Financial Situation.

It is difficult to separate the finances of the Association and the JOURNAL. The work of both is so thoroughly interwoven that separation becomes almost impossible. A different system of bookkeeping to the one used might be of assistance. It is obvious, of course, that the expenses of the Association are small compared with those of the JOURNAL. The financial statements appended are worthy close study. It must be remembered that $14\frac{1}{2}$ months have elapsed since the Colorado Springs Meetings. A financial statement for the year ending August 31, 1914, is presented and also a supplementary statement for the period from September 1 to November 18. A condensed balance sheet for the whole period ($14\frac{1}{2}$ months) shows that the excess of Quick Assets over Immediate Liabilities is $32.76. This would indicate solvency, but of course there is an item of unearned paid subscriptions which would have to be rebated if publication ceased.

Donations.

For the year ending August 31, 1913, $2,000 was donated and this, with $2,500 borrowed on the Trust Funds of the Association, made it possible to keep the JOURNAL going. With the Trust Funds largely used up, it became necessary to raise money for the year ending August 31, 1914, by donations alone. Doctor Farrand, in the fall of 1913 wrote to the members asking for

assistance and in all $1,212 was received from many generous members, who gave in many instances sums which really meant personal sacrifice. However, when the business end of the JOURNAL was transferred to Boston in January, it was still necessary to raise more funds. Your editor asked for the assistance of Prof. W. T. Sedgwick, an honored member of the Association, who tackled an always unpleasant task, and received donations amounting to $2,850 from some generous Boston men, who gave really to Professor Sedgwick and not to the Association and the JOURNAL. A generous and ever helpful friend and member of the Association later gave $600, making a total of $4,662 donated during the year.

When the business end of the JOURNAL was transferred to Boston in January, $3,500 was owed the Rumford Printing Company for printing the July, August, September, October, November and December issues of 1913 and the last edition of the Standard Methods of Water Analysis.

This was a heavy load to undertake, but we have since been able to pay $2,400 on the 1913 accounts and besides have paid for printing all of the issues for 1914 except for November, the bill for this only having been recently rendered. I feel that this is a very good showing and it makes me feel very sanguine for the future. It has been demonstrated that it costs a great deal to get new members and new subscribers, but our salvation lies in these directions at the present time, and we have indications that our present methods are being successful. To build up a large subscription list is the work of time,—it cannot be done over night.

It is interesting to note that in the year ending August 31, 1913, we paid $2,501.85 to the printers and in the year ending August 31, 1914, $4,556.35. This last amount included a number of 1913 bills and this explains the apparent increase. The actual cost of printing the 1914 volume will probably be less than was paid for printing 1913.

It is interesting to note that even taking into consideration the fact that in 1914 we have paid these 1913 bills, and have had the extra expenses of moving the office from New York to Boston, the actual disbursements for 1914 are $15.54 less than for 1913—$13,032.39, as against $13,047.93.

General Conclusions.

These facts are presented to you to show that the present financial situation while still presenting many difficulties, is on the whole better than it was in August 1913.. Our incomes last year *exclusive of gifts* averaged $816 a month. According to our present budget our expenses per month for 1915 should not exceed $950. Assuming that our income from regular sources will not decrease, and there is no reason to imagine that it should, we have a deficit of only $1,600 for 1915 as against one of $4,000 to $5,000 for the previous two years.

It certainly will be necessary to raise some money unless our membership and subscription lists should increase sufficiently in the interim to wipe out the threatened deficit.

Many members have given us their earnest coöperation in our efforts to increase both memberships and subscriptions. There is no better way to help than in this manner. If *every* member would get only *one* new member and subscriber at $5, our difficulties would disappear at once and we should become self-supporting, and with the additions we would be in a much better position to get advertising and to increase our advertising rates.

To the generous donors of funds, to the members who have given no less generously of their time and thought, I extend grateful thanks. If the many who as yet have not taken any special means to assist could only become infected with the enthusiasm of the few and go and do likewise, present financial problems would be quickly dissipated, and our time and attention could be given more constantly to the aims of improving the Association by making it more useful to you and to the countries represented in it, and by developing a Public Health Journal nearer our ideals and aspirations. Who will aid in making these hopes and ideals real?

In earnest and for service,

Respectfully,

SELSKAR M. GUNN,

Editor and Secretary.

REPORT OF THE TREASURER AMERICAN PUBLIC HEALTH ASSOCIATION.

SEPTEMBER 1, 1914.

August 31, 1913, Balance in Lincoln Trust Co.		$462.55
RECEIPTS.		
Association Dues	$2,579.25	
Advertising	1,886.48	
Donations	4,662.00	
Refunds and Allowances	7.91	
Interest Receivable	28.52	
Subscriptions to JOURNAL, Sales of JOURNAL, Sales of Water Reports, Sales of Transactions, Sales of Milk and Air Pamphlet, Misc. Receipts	5,291.87	
		14,456.03
		$14,918.58
DISBURSEMENTS.		
For JOURNAL:		
Printing JOURNAL	$4,556.35	
Mailing JOURNAL	274.35	
Cuts for JOURNAL	1.09	$4,831.79

For Association:			
Colorado Springs Expenses		$558.95	
For JOURNAL and Association:			
Salaries	$2,575.00		
Pay Roll	1,339.97		
Stationery and Supplies	166.40		
Postage	557.02		
Trans. on Sales	32.61		
General Expenses	501.15		
Interest and Discount	175.06		
Re-sales	24.19		
Rent	323.35		
Boston Office Expenses	587.78		
Refunds	13.97		
Storage	105.90		
Misc. Printing	933.35		
Office Fixtures	131.90		
Transfer from Gen. Acct. to Drawing Acct.	100.00		
Traveling Expenses	74.00		
Shorts and Overs	.01	7,641.66	$13,032.40
August 31, 1914, Balance			$1,886.18

SUPPLEMENTARY REPORT OF THE TREASURER AMERICAN PUBLIC HEALTH ASSOCIATION.

SEPTEMBER 1, 1914 TO NOVEMBER 18, 1914.

September 1, 1914, Balance in Paul Revere Trust Co.			$1,886.19
RECEIPTS.			
Association Dues		$646.00	
Advertising		391.14	
Donations		85.00	
Refunds		2.99	
Interest Receivable		2.36	
Subscriptions to JOURNAL			
Sales of JOURNAL			
Sales of Water Reports		1,022.76	
Sales of Transactions			
Sales of Milk and Air Pamphlet			
Misc. Receipts			2,150.25
			$4,036.44
DISBURSEMENTS.			
For JOURNAL:			
Printing JOURNAL	$1,755.59		
Mailing JOURNAL	50.00		
Advertising for JOURNAL	20.00	$1,825.59	

For JOURNAL and Association:			
Salaries	$600.00		
Pay Roll	398.50		
Stationery and Supplies	134.53		
Postage	201.05		
Office Expenses	70.63		
Interest	2.92		
Rent	127.91		
Refunds	3.25		
Misc. Printing	122.23		
Office Fixtures	50.00		
Traveling Expenses	25.00	$1,736.02	$3,561.61
November 18, 1914, Balance			$474.83

BALANCE SHEET AMERICAN PUBLIC HEALTH ASSOCIATION.

CONDENSED TO SHOW QUICK ASSETS AND IMMEDIATE LIABILITIES.

As of Date November 18, 1914.

ASSETS.

Cash:		
Conn. Savings Bank	$1,829.15	
Nat. Savings Bank, New Haven	1,243.30	
Paul Revere Trust, Assoc. Account	474.82	
Paul Revere Trust, Office Account	35.04	
Cash in Office	8.90	
		$3,591.21
Accounts Receivable:		
Due from Sales and Subscriptions	249.00	
Due from Earned Advertising	320.84	
Due from Association Dues	279.00	
		848.84
Total Assets		$4,440.05

LIABILITIES.

Bills Payable:		
Paul Revere Trust Co., Loan		$2,500.00
Accounts Payable:		
Due Creditors on open account,		
Miscellaneous Office Expenses,	$52.98	
Rumford Printing Co.	1,854.31	1,907.29
Excess of Quick Assets over Immediate Liabilities		32.76
		$4,440.05

THE SIGNIFICANCE OF TYPHOID CARRIERS IN COMMUNITY LIFE, WITH A PRACTICAL METHOD OF DETECTING THEM.

O. McDaniel, M. D., and E. M. Wade, M. A.,
Division of Preventable Diseases, Minnesota State Board of Health.

Read before the Section of Public Health Officials, American Public Health Association, Jacksonville, Fla., December, 1914.

THE value of the Widal reaction in determining typhoid carriers has received very little place in this country in routine investigations or in literature. In 1911 Bigelow[1] reported its value in tracing the source of an epidemic of 213 cases. This was a man working in a dairy. He had had typhoid fever twenty-six years previously, and no symptoms since until, two weeks before typhoid fever broke out on the route, he had had a slight attack of diarrhea. B. typhosus was isolated from the urine. In 1912 Bigelow[2] reported a second successful attempt at isolating the source of infection of fourteen cases.

The first confirmation of these results was made by one of the writers in 1912 when request was made for the examination of the stools and urine of sixty members of a boat crew among whom several cases of typhoid fever had occurred within a month's time. From the fact that this freighter had been at sea for about a month and that there had been practically no chance of infection from without, it seemed that a carrier must be directly responsible.

The medical inspector was asked to submit to the laboratory blood specimens for the Widal test instead of specimens of stools and urine and if a carrier could not be found by this means the examination of the excreta would be undertaken. It was stated, however, that owing to the large amount of work entailed and the small laboratory force, only fifteen or twenty specimens could be attempted at a time. Also it was stated that under the best conditions much time must elapse in attempting isolation tests and that negative results were of little or no significance. The medical inspector realized that it would be difficult to detain the crew for the time necessary for this work and agreed to submit blood specimens. By evening of the day the specimens were taken, a report was returned and the cause of the infection located. Later B. typhosus was isolated from the feces of this man. This man was not employed in the handling of food but it was decided that an open water tank was responsible for the spread of the infection.

During the current year, 1914, this method has been used in the epidemiological investigations of typhoid fever by the Division of Preventable Diseases of the Minnesota State Board of Health and five very interesting cases are here reported. These epidemiological investigations have been made

under the direction of Dr. A. J. Chesley, Director of the Division.

1. Four cases of typhoid fever having occurred on a farm within five years, a search for the source of infection was commenced. The first of these cases occurred in L. D. H. in September, 1909, three months after his marriage. He had had typhoid fever forty-five years previously. This was followed by a case in August, 1910, in a nephew of L. D. H. which ended fatally. In July, 1913, a farm hand employed on this farm since July, 1911, developed typhoid fever and the fourth case occurred in December, 1913, in another farm hand who had been on the farm only since November.

Mrs. L. D. H. gave a history of typhoid fever in September, 1898, while a nurse. Recovery was slow and since that time she had had rheumatism, chronic appendicitis and "liver trouble." There was no history of gall stones.

Sanitary investigation of the premises by Dr. H. G. Lampson showed conditions to be above suspicion. Blood specimens for the Widal reaction were taken from residents of the farmhouse and the blood of Mrs. L. D. H. only showed the reaction to be present (1:50). Because of the presence of this reaction, specimens of her feces and urine were submitted to the laboratory for examination and B. typhosus was isolated from the feces. The fact that Mrs. L. D. H. was a trained nurse and used more care than might ordinarily be expected, undoubtedly accounts for the fact that there were not more cases traced to her.

2. Fifteen cases of typhoid fever occurring in the family and among its associates caused an investigation to be undertaken. The first case, Mrs. E., occurred in October 1909, since which time she has been disturbed mentally. The two daughters of Mrs. E. and the nurse in attendance developed typhoid fever in October and November of the same year, as also did a relative of Mrs. E. who lived across the road.

In the fall of 1911, four cases occurred in the family of the relatives across the road. In 1912 four more cases developed in the immediate vicinity, two of whom, however, denied contact with the family of Mrs. E. In 1913, one case occurred in the family across the road and in 1914 two more cases were traced to this same source.

Sanitary investigation by Dr. W. P. Greene showed some flies to be present and the privy about four rods from the kitchen to be unscreened. Otherwise conditions were good.

Blood specimens for the Widal reaction were taken from the members of the two families. The blood of Mrs. E. only showed the reaction present (1:50). Therefore specimens of feces and urine were obtained from her and sent to the laboratory. B. typhosus was isolated from the feces.

3. The appearance of typhoid fever in a case, G. S., not exposed to any known infection caused the investigation in September, 1914.

Investigation by Dr. W. P. Greene showed all probable sources of infection except the milk to be above suspicion. Milk was obtained from the

farm of L. B. where no typhoid fever existed. L. B. and Mrs. L. B. had both had typhoid fever twenty-eight years previously. Only two cows were kept by L. B. and so but few people used milk from this source. Milking was done by Mrs. L. B.

Blood specimens for the Widal test were taken from all residents at the farm. The only specimen showing the reaction present (1:50) was that from Mrs. L. B. and from her, specimens of feces and urine were sent to the laboratory. B. typhosus was isolated from the feces.

Upon determination of Mrs. L. B. being a carrier, information was obtained from a physician who had been resident of the town and a near neighbor for the last seventeen years. He himself used milk from this farm and developed typhoid fever in 1907. He states in a personal communication: "I do not recollect or have any means of ascertaining the milk supply of all the cases I have attended, and naturally less information about those attended by other physicians. However, I have a partial list of the typhoid cases supplied from this dairy, numbering sixteen to date, half of which I have attended professionally. Twice, at least, they have come in waves, those occurring eight years ago and this year. Some cases were light, some ordinary and some fatal."

4. Three known and other suspected cases of typhoid fever occurring during the present year in the family and employees of B. J. B., who operated a home bakery, caused the investigation. The first case occurred in January in a clerk employed in the bakery and the second case in July in another clerk. The latter acknowledged taking meals at the bakery. In October another employee developed typhoid fever.

Upon investigation by Dr. W. P. Greene, it was learned that Mrs. B. J. B. had had typhoid fever in 1908, Mr. B. J. B. in 1909, a niece in 1911 while visiting the family and the parents of Mrs. B. J. B. had both had typhoid fever forty-seven years previously.

Blood specimens for the Widal reaction were taken from all members of the family and the employees. The only one showing the presence of the reaction (1:50) was Mrs. B. J. B. Specimens of the discharges have been examined twice but so far isolation of B. typhosus has not been accomplished. Repeated examinations will be made.

5. Ten cases having occurred on a farm owned by W. W. S., investigation of the premises was made.

The first case developing on this farm was a contact case infected by a patient who was taken there to be cared for after having been infected in a railroad camp. This was in 1882 and no more cases occurred for twenty-four years. In 1906 an employee returned to the farm sick with typhoid fever after having been infected while working with a threshing crew. W. W. S. developed typhoid fever from contact with this case. In 1911, a daughter and the wife of W. W. S. developed typhoid fever. In 1914, four cases occurred—a maid, a hired man, a son, and finally the three-year-old daughter of an employee.

Investigation of the premises by Dr. H. A. Burns showed conditions

to be above suspicion and the source of the infection seemed to be one or more carriers.

Blood specimens for the Widal reaction were taken from all the residents and only the specimens from W. W. S. and Mrs. W. W. S. showed the reaction present (1:50). Feces and urine from both these individuals were examined and from the feces of each B. typhosus was isolated.

The next use to which this test was put was to locate and determine the number of typhoid carriers in two large state institutions, A. and B, in which typhoid fever was endemic. The examinations served a double purpose in that they were made just prior to the immunizing of the residents against typhoid fever by the administration of vaccine. Studies of the blood of the inmates following vaccination are given elsewhere.[3]

Institution A was a state hospital for the insane with a resident population of about two thousand. In this institution, typhoid fever had been endemic for many years. The water supply was above suspicion and was the same as the city water. The milk was all supplied from their own cows and general sanitary conditions were of the best. In January, 1913, the month preceding this investigation, seven cases of typhoid fever occurred in the institution, with three deaths. In February, the first blood specimens were taken and following these vaccination commenced. During the eight months the immunizing was in progress, eight cases occurred. During the next six months, when the majority of the inmates were immunized, but two cases occurred, but as the unvaccinated increased in numbers by new admissions, the number of cases of typhoid fever began to increase and three or four cases followed one another in close sequence. In all, within the eighteen months following the beginning of immunization, sixteen cases occurred with a mortality of four, or 25 per cent. All cases were among the unvaccinated and at the end of this time, July, 1914, the immunization of all having entered the institution since the previous immunization was undertaken.

One case deserves special mention—a patient, E. R., female, 22, unvaccinated, was in the tuberculosis ward but had become an arrested case and was transferred to another ward in which all the other inmates had been immunized. Living conditions were identical but she and she alone developed typhoid fever. Other similar instances occurred. To avoid typhoid fever it would seem advisable to administer typhoid vaccine to patients on entering the institution.

In September, 1914, one case which showed a positive Widal reaction following vaccination in 1913, developed symptoms of typhoid fever. Laboratory examination of feces and urine from this patient failed to demonstrate the presence of B. typhosus but B. paratyphosus was found to be present. In October another case developed symptoms of typhoid fever. The diagnosis was confirmed by the finding of B. typhosus in the stools. The blood of this patient did not show the presence of agglutinins following vaccination and there had been some

doubt in the minds of the hospital authorities of the successful vaccination of this patient.*

The blood specimens from 1,928 persons gave the following results: 37 showed the reaction present; 17 showed the reaction atypical and in the rest the reaction was absent. Owing to unavoidable circumstances there was delay in attempting isolation of typhoid bacilli from these cases but this was commenced a short time ago and so far we have been able to isolate B. typhosus or B. paratyphosus from five cases giving a positive Widal reaction and from one case showing a partial reaction. These examinations are being continued.

The hospital records of these patients were searched thoroughly for history of typhoid fever. This was a difficult matter as few physicians interested in the mental condition think of taking notes on the medical condition and especially on the history of infectious diseases. Of the 37 cases showing a Widal reaction before inoculation, 7 gave definite history of typhoid, B. paratyphosus having since been isolated from the stool of one of these, 3 gastro-intestinal symptoms, B. paratyphosus having since been isolated from the feces of one, 4 continued fever over extended periods of time, B. typhosus having since been isolated from the feces of one of these, and 23 gave no history but from the feces of two B. paratyphosus has been isolated. Of the 17 showing a partial Widal reaction, 4 gave definite history of typhoid, 3 gastro-intestinal symptoms, 2 continued fever and 8 gave no history but from the feces of one B. typhosus has been isolated.

TABLE I.

SHOWING HISTORY OBTAINABLE FROM 54 POSSIBLE CARRIERS.

Widal reaction.	History of typhoid.	Gastro-intestinal symptoms.	Continued fever.	No history obtainable.
Positive 37	7†	3†	4‡	23§
Atypical 17	4	3	2	8‡
54	11	6	6	31

We desire to point out that the histories in these cases are not complete, and undoubtedly if more complete records were obtainable a larger number of histories of previous typhoid infection would be acknowledged. It is believed by the writers that when the examinations of these cases are completed it will be definitely proven that a large number are typhoid carriers and therefore largely responsible for the endemic typhoid in the institution.

Institution B, a school for feeble-minded and epileptics, has a resident population of about seventeen hundred. In this institution typhoid fever had undoubtedly been endemic for years but not recognized as such as the

*This case was one of a group of 205 persons vaccinated by one man of which 90 failed to show agglutinine in the blood following vaccination. See also paper by Dr. C. C. Burlingame.[4]

† *B. paratyphosus* isolated from the feces in 1 case.

‡ *B. typhosus* isolated from the feces in 1 case.

§ *B. paratyphosus* isolated from the feces in 2 cases.

authorities claimed no typhoid fever for at least twelve years. In the first few months of 1914, many cases of typhoid fever appeared. The authorities, believing they had had no typhoid fever previously, looked for the cause of this outbreak among the new kitchen employees but they were not able to locate the source there. After some delay they finally agreed to vaccinate all inmates of the institution and this was taken advantage of to try to locate their carriers by the Widal test.

In all, specimens of blood were obtained from 1,548 persons and of these, 20 showed the Widal reaction to be present, from each of which specimens of feces and urine were submitted to the laboratory. To date, 7 of these 20 persons have been proven to be carriers, B. typhosus having been isolated from the feces of six and B. paratyphosus from that of one. Further examinations of the discharges of the remaining 13 persons are now being made. Because of the mental condition of these patients and the incompleteness of the hospital records, no history was obtainable in these cases.

The agglutinating property of the blood serum in various infections which was discovered in the course of studies in immunity by numerous workers was adapted to the practical diagnosis of typhoid infection by Grünbaum and by Widal and since Widal's communication in 1896 has proven to be of invaluable assistance in diagnosis. The extreme accuracy of this diagnostic method was early attested to by many and its use very rapidly became general. Today, after eighteen years, the Widal reaction appears to have greater value as an aid in diagnosis than even the most sanguine at first believed it to possess. Some of the early errors have been corrected by improved technique, especially by the use of the dried blood modification, by the changing to a higher dilution of the blood, and by very great care in regard to the culture used, and the more general use of the microscopic method as preferred by Widal. Some of the early errors were errors of interpretation only. Many of these were soon pointed out through the study of numerous cases of cholecystitis, cystitis and osteomyelitis, some of which had not been preceded by an attack of typhoid fever but in which the Widal reaction was present and B. typhosus was isolated from the bile, urine or abscess.

Apropos of such cases, Professor Welch[5] in 1897 pointed to the accuracy of a positive Widal reaction when he said "Infection with the typhoid bacillus cannot be positively excluded either on clinical grounds alone or by anatomic examinations at the post-mortem table."

After reporting the results of the examinations of 1,845 blood specimens taken from 1,100 persons, Wesbrook and Wilson[6] in 1897 referred to both the accuracy and the public health value of a positive reaction as follows: "There seems to be a wider field of usefulness for this method in the protection of public health from the contaminating sources made apparent by its use, which is almost, if not quite, equal to that afforded by the cultural diagnosis of diphtheria." These

writers probably did not have chronic carriers in mind but they suggested that persons in whom a positive reaction is present be placed under official surveillance until negative bacteriological examination of the discharges are made.

As early as 1899, after reporting a case of chronic cystitis continuing five years after typhoid fever and from which B. typhosus was obtained in purity from the urine, M. W. Richardson[7] called attention to the danger from such bacillus carriers and suggested the necessity of supervising these cases for years.

The actual tracings of cases to carriers following the lead of v. Drigalski and Conradi in 1902 and the suggestions of Koch and Frosch in 1903 have been reviewed so frequently that they are familiar to all. A review of the literature of carriers together with a discussion of the numerous problems concerning them was made in 1910 by Sacquépée[8] who also gave a comprehensive classification of typhoid carriers. More recently Müller[9] in 1913 has taken up the subject of typhoid bacillus carriers in insane asylums, and discussed in detail the problems involved. The main points of value in the exceedingly important and painstaking work of the many workers especially those of southwestern Germany have been repeatedly brought to mind and will not be detailed here. The constantly increasing long list of observers headed by Dönitz,[10] Lentz,[11] Forster,[12] for the most part agree that the Widal reaction is present in the blood of bacillus carriers with but few exceptions. Several of these observers call attention to the value of the Widal reaction as a preliminary test in the epidemiological search for carriers. Lentz in 1905 found the reaction present in ten out of eleven carriers and considered it of value especially when found in high dilutions. Friedel,[13] 1906, confirmed the constancy of the Widal reaction in carriers and considered it of value in detecting them. Bötticher[14] in 1906 found the Widal reaction almost universally present in bacillus carriers, but finding a fluctuation in the agglutinating power within wide limits he considered it advisable to begin with a titre of 1:10. Ledingham[15] in 1907 stated that the Widal test is a distinct aid in finding carriers but added that several would have been missed if searched for by the Widal test alone. Davies and Hall[16] in the same year also mentioned the importance of the Widal reaction in the determination of carriers. Müller[9] reported in 1913 that upon the advice of Hilgermann he had used with satisfactory results the Widal reaction in searching for carriers in an insane asylum. He recommended that in insane asylums all employees as well as patients be investigated for carriers upon entrance to the institution, advising that at least three negative bacteriological investigations of stools and urine be made in all persons whose blood agglutinated either B. typhosus or B. paratyphosus. Further that carriers should be excluded from the kitchen work and that "carrier patients" should be segregated, and suggested that "carrier nurses" might be put to good service in caring for such patients.

In the asylum at St. Thomas, Müller was unable, up to the time of reporting, to show that all who gave the agglutination reaction were bacillus carriers. It is interesting to note, however, that when after five negative bacteriological investigations of the discharges in one case and three in another he found both bacillus carriers, Müller concludes that they must have been carriers much earlier since they had respectively given a positive agglutination reaction ten and eight months previously. Scott[17] in the same year mentioned the value of the Widal reaction in healthy persons considering some to be carriers. Others he considered to be non-carriers, but no statement was made as to the number of bacteriological examinations of the feces and urine. He, however, recommended the Widal test as a routine procedure in all applicants for employment in the kitchens of institutions, and put such practice into effect at the General Penitentiary, Kingston, Jamaica. Not the least important point demonstrated by the southwestern Germany investigators is the fact that the bacteriological examination of feces and urine are not to be depended upon when negative results are found, a fact that has been confirmed by all observers upon this point. Not only are typhoid bacilli not found for considerable periods of time in the discharges of typhoid carriers who later show the discharges to contain typhoid bacilli, but there may be many failures to find typhoid bacilli even in the course of typhoid fever itself. The intermittency of the discharge of the bacilli, the difficulties of isolating when the organisms are few in number, the lack of satisfactory methods of transportation of specimens, and the possibility of substitution of specimens all are factors in making negative findings unreliable.

Because of the almost constant finding of the Widal reaction in the blood of bacillus carriers and because of the experience of others as well as of ourselves, it is desired again to call attention to the value of the Widal reaction as a preliminary test in attempting to locate carriers. In institutions and in outbreaks of typhoid fever under all conditions where the epidemiological evidence points to one or more carriers, the desirability of locating them is apparent. The determining and excluding of carriers from among institutional kitchen employees as practised by Scott should be widely adopted. Why stop here? Why wait for case after case to arise in boarding houses? Why wait for an outbreak of 213 cases in one dealer's milk route? While health board executives may have some of their troubles increased in the finding of bacillus carriers especially in civil life, it is impossible to agree with Overlander[18] that it is impractical to search for them at least in certain places. When one considers the large number of cases that have been traced to one carrier especially, through the handling of food even in one short exposure, surely the larger good of the many overshadows the hardship wrought upon the individual.

A positive Widal reaction in unvaccinated persons so certainly indi-

cates infection with typhoid bacilli that it is suggested that it might properly be used as an indicator for the exclusion of persons from work concerned in the handling of food or milk where the public health is concerned, *e. g.*, in dairies, creameries and milk depots including milkers and distributors, in bakeries, hotels, restaurants, and boarding houses, and in all schools, hospitals and penal and other institutions.

Health departments might place this test on their official score cards for dairies, creameries, etc., and thereby soon educate the public to demand that typhoid carriers be excluded from these occupations. Employment agencies would soon coöperate.

If it is true that one fifth of the chronic carriers (Conradi[19]) would escape detection by this application of the test, the number occupied in the handling of public food and milk supplies who would thus escape detection would be reduced to a minimum. It is understood that whenever the epidemiological evidence points toward one or more persons as possible carriers and the Widal reaction is absent (1:50 and 1:25), repeated examinations of the excreta should be made.

The exactness of positive bacteriological findings is incomparable in its desirability but if it is possible for one to fail to find typhoid bacilli in the discharges of a carrier on 75 consecutive days and then get a positive result, as reported by Semple and Greig, it is apparent that even repeated negative findings do not protect the public.

Most of the observations on the persistence of the Widal reaction have been made without corresponding observations on the persistence of the bacilli, but that it disappears following illness in a majority of cases in from a few months to one year is a common finding.

In a recent series of 44 cases of typhoid fever in which the reaction was present, later examinations made between the 90th and 120th day following onset showed 19 negative, 17 positive and 8 partial reactions. The persistency of this reaction for a longer or shorter period after the final disappearance of the typhoid bacilli adds safety to the test.

The occurrence of a positive reaction in certain tuberculosis cases as has been reported from time to time would not lessen the value of this test in its practical application to protect the public since tuberculous persons should be excluded from all work concerned in the handling of food. It would be interesting to know how many of these tuberculosis cases might be shown to be carriers of typhoid bacilli if daily bacteriological examinations of the discharges over a number of months were made.

The exceptional finding of a positive reaction in a person infected with paratyphoid or dysentery bacilli again only adds safety to this test. Here, too, persistent bacteriological examinations might show B. typhosus also to be present.

To be sure this test lacks in not affording positive proof that a person harbors typhoid bacilli and therefore would be dangerous to the public through the handling of food. In this respect, however, it is comparable to the

colon test which has long been used as an indicator of a dangerous water supply.

With our public water supplies safeguarded greater attention should be given to the protection of the public food supply as pointed out by Conradi and others and as evidenced by such outbreaks as that due to the Folkestone milker and the two recent outbreaks due to food pollution in this country.

References.

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[2]*Jour. A. M. A.*, 1912, LVIII, 1339.
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[4]*Journal-Lancet*, Minneapolis, XXXV, No. 7, 1915.
[5]*Jour. A. M. A.*, 1897, XXIX, 301.
[6]*Phila. Med. Jour.*, 1898, March 26.
[7]*Jour. Exp. Med.*, 1899, IV, 19.
[8]*Bull. L'Inst. Past.*, 1910, VIII, 1 and 49.
[9]*Zeit. f. Hyg. u. Infectionsk.*, Bd. LXXIV, 138.
[10]Festschr. z. Sechzigsten, Geburtstage v. Rob. Koch, s. 297, 1903.
[11]*Klin. Jahrb.*, 1905, Bd. 14, Heft 5, 475.
[12]*Münch. Med. Wchn.*, 1905, s. 1473.
[13]*Hyg. Rundschau*, 1906, Nr. 1.
[14]*Zeit. f. Hyg. u. Infectionsk*, Bd. LXVII, 243.
[15]*Brit. Med. Jour.*, 1908, II, 1173.
[16]*Brit. Med. Jour.*, 1908, II, 1175.
[17]*Practitioner*, London, 1913, XCI, 589.
[18]*Bost. Med. and Surg. Jour.*, 1913, CLXIX, 37.
[19]*Deutsche Med. Wchn.*, 1913, s. 66.

Discussion.

Dr. Bristol, *North Dakota:* In the neighboring state to Minnesota where Miss Wade has done her excellent work, that is in the state of North Dakota, the director of the state laboratory is also professor of bacteriology and hygiene, and at the same time is chairman of what we call our Students' Health Committee. Believing that the State University is responsible in a very large measure for the health of the students, we are about to recommend that this test be adopted, and that all those who apply for positions in the college commons shall submit to this test. We have somewhere near a thousand students, and a large majority of these students eat in the college commons and we are about to recommend that all who handle food in any way in the college commons shall submit to this test to determine whether or not they are carriers, at least whether their serum will agglutinate, and if so, to make further examination to determine whether or not they are carriers. I believe that quite a severe epidemic has occurred at Lehigh University, Pa., and this was charged to a servant in the kitchen of the college commons. I believe that will be of great practical value as eliminating these epidemics from such institutions.

Dr. P. S. Schenck, *Norfolk, Va.:* I want to relate two instances, one of which demonstrates how exceedingly difficult it is to locate a carrier and since I believe all public health workers are of the opinion that a vast majority of all our cases of communicable diseases are unquestionably due to carriers, we can account for them in no other way. This case in particular occurred on a Dutch ship which left West Hartlepool and came straight across the Atlantic Ocean to Norfolk. On the 5th of October it arrived, without having touched at any other point between those two points, and being a tramp ship, it was 26 or 27 days out. A day or two after her arrival, typhoid fever developed on board and in about ten days there were 16 cases of typhoid taken from the ship to St. Vincent's Hospital, leaving only 10 aboard out of a total crew of 26. Our services were called in at the request of the state quarantine officer who has no facility for making bacteriological or any other kind of examination, and we set to work to investigate the cause of this epidemic of typhoid fever on this ship. We have in our laboratory Doctor Andrews, who is acknowledged to be thoroughly conversant with his work. He, in conjunction with the state quarantine officer, searched that ship from top to bottom, and made a Widal of every man aboard and we then called in Doctor Newton, of the staff of Johns Hopkins, who has a bacteriological and pathological laboratory, but in spite of everything we could do we were unable to locate the cause of that epidemic.

The next case was one that has given me such great concern that I was almost afraid to leave Norfolk to come to this meeting. Up to the

time I left, which was on the 28th, we had had 9 cases of typhoid fever in the city of Norfolk and all 9 of them took their milk from one man. Now you gentlemen will probably say at once, "Well, that was easy." Well, it was not easy. This man drew his supply—he is a wholesale milk distributor and was formerly in the dairy business himself—he takes the entire output of 1,250 cows from 11 dairies. That typhoid began early in the month and we noticed the coincidence right away, and I assigned both of our milk inspectors to the case and they investigated everything about those dairies that we could possibly get hold of. We could locate nothing. Now, the most remarkable thing to my mind in this matter is, and I had to treat it as a coincidence, that the output of these dairies is efficiently and thoroughly pasteurized every day. In fact he does an extra pasteurization because I had a little controversy with him a few days before this happened and I told him that I was going to score him according to the lowest dairy from which he took milk, because in mixing the product, it was my opinion that he should have the score of the lowest dairy from which he took milk. He took it from dairies that scored all the way from 70 to about 86, so he has been pasteurizing with 145 degrees for 30 minutes, a thorough pasteurization, and it is one of the most remarkable cases I know of that all those 9 cases should take their milk from one house that thoroughly pasteurized its milk.

Dr. Ada E. Schweitzer, *Indianapolis:* We have done some work in the detection of typhoid carriers and a case that recently came to to our attention may prove to be of special interest. Not very long ago a woman came the laboratory, carrying a small baby in her arms, with a story. She said that the local board of health in a town in the northern part of the state had quarantined their milk-supply. Her husband was a dairyman and had recently built a new milk house and gone to some considerable financial expense in fixing up their farm and having everything in a sanitary condition, but the local board of health had detected cases of typhoid along the route of this dairyman. The water supply had been found to be unquestioned and the milk supply was the only thing on which they could base a contention for carrying the typhoid infection. She was suspected of being a carrier. They wanted an examination made of this woman and had asked her to go to the local hospital. She did not understand that it would be necessary to have a series of experiments in case the first proved a negative. She went to the hospital, had the specimens taken and then went to her home, but she felt that she was not being used fairly by the local health department and came to Indianapolis and asked the State Department to make the examination. She went into the hospital and had specimens taken at intervals. As soon as she went in, we took a specimen for Widal test and there was only a partial agglutination. The specimen taken on the second day, however, proved positive. Then the tests were made from specimens of feces taken at successive intervals, and the first specimen proved negative. A specimen taken at a later time proved positive and we found that she was a typhoid carrier. The history showed that she had had typhoid nine years before and had practically forgotten all about it. She was a young woman and they had had no typhoid in their own family. There were a number of cases traced along this route and a number of deaths in some of the towns supplied from this dairy.

Miss Wade: I would like to emphasize one fact that I think is of great importance and that is the running of the Widal test at a low dilution when looking for carriers. Our routine dilution for our regular work is one in fifty, using the dried blood method, but for carriers I believe we should use a dilution at least as low as one in twenty-five and in a very suspicious case, go down as low as one in ten. Doctor Schenck spoke of a case of typhoid infection in which the milk was pasteurized. He did not say whether it was pasteurized in bulk or in bottles. If it was pasteurized in bulk and bottled latter, there would be a chance for typhoid contamination from a carrier. Regarding a positive Widal reaction following vaccination I would say that subject is being presented in a paper downstairs in the Laboratory Section. Our general conclusion is that if, in a large series of cases, Widal reaction is absent, then there is some trouble somewhere. You should get probably at least 90 per cent. of positive Widal reactions following administration of the vaccine. I am speaking of the vaccine made according to regulations of the United States Army Medical Corps.

Dr. Krumwiede, *New York City:* Miss Wade

has brought out the question of the intermittenee of exeretion, and there is one ease in New York City that turned up reeently. Bellevue Hospital is in the habit of not diseharging any typhoid eases without three negative examinations and I was detailed to investigate a death that oeeurred from typhoid fever after vaeeination and I found that the mother of this woman was a typhoid carrier and had been discharged from Bellevue after three negative examinations, so we cannot absolutely rely on that matter to prevent the eseape of earriers from the hospital. The other thing is an epidemie that I had the opportunity to investigate, and we took the Widals for all the hands on the farm and found one who gave a suspicious reaction, but we could not find typhoid bacilli in the stools. We got stools from all employees and found typhoid baeilli in stools of one that did not give a reaetion. Well, we were worried about this and meanwhile, the man who gave a negative reaetion, gave a partly positive reaetion and was under suspieion, left the farm. We then excluded this man we found that had typhoid baeilli in the stool and the epidemie promptly and sharply ceased. We kept that man under observation for six months and he never had typhoid baeilli in the stool again, and about three months later the other man returned to the farm and they had another outbreak of typhoid and found typhoid bacilli in the stools. In other words, I might say, we investigated the conditions; there could be no question about substitution of speeimens or mix-ups, so we had a typhoid carrier that was intermittent and, what I think we forget too often in relation to diseases, we had present a normal transient earrier, and the point I want to bring out is the importance of the normal transient carrier and that carrier may be the source of infection and will not give a Widal.

THE SANITATION OF SAND PILES.

WALLACE A. MANHEIMER, PH. D.,
The Department of Bacteriology, Columbia University, New York.

THERE are several hundred sand piles in New York City, maintained either at public expense or by private subscription. The former are controlled by three different city departments, the Department of Parks, the Public Recreation Commission, and the Department of Education. Associations such as the parks and playgrounds association, church organizations, private kindergartens, playgrounds on the roofs of apartment houses, etc., maintain sand piles or sand-boxes in which children play. It is evident, therefore, that the existence of unsanitary conditions in sand piles affects the health of a great many of the young of our city.

Sand piles are usually situated under cover of permanent sheds, and under tents. Many, however, are protected from the sun by trees, or by the shadow of houses, while a few are exposed to the glare of the sun. Of the sand piles examined by the writer, all except No. 11, were supervised by playground teachers. There are, however, many unsupervised sand piles, installed by the Department of Parks, which are renewed, as are the others, when the quantity of sand becomes diminished through scattering. In most cases, it was found, the sand used was the common building sand, which when damp retains the moisture for a long time. In a few places, white quartz-sand was employed, and this in every case was drier than the building sand.

Children are never refused permission to use the sand pile. In a few cases children with wet and soiled diapers were seen sitting in the sand, thus adding pollution. It was also observed that the secretions of the nose and mouth became mixed with the sand. Since the large majority of infections are transmitted by the agency of the buccal, nasal and alvine discharges, and since these materials become to a greater or lesser extent mixed with the sand, the sand pile becomes a possible source of infantile infectious diseases.

At present, sand piles are not disinfected or cleaned in any way. The old sand, furthermore, is never removed, the new sand when added being merely dumped on top and allowed to mix with it. Stray dogs and cats have often been observed to pollute the sand pile, and complaints about this have frequently been made to the park attendants.

BACTERIOLOGICAL INVESTIGATION.

Samples of sand were collected, in sterile bottles, from eleven sand piles on the lower West Side of New York. These piles were selected because the neighborhoods were about the average, being neither the worst nor the best in New York. One gram of the sand so collected was added to 5 cc. of salt solution in a tube, and then vigorously

shaken. From this dilutions were made in the usual way, and plated on standard meat infusion agar.

The results of the analysis are shown in the following table.

Park no.	No. of children using sand pile per day.	Sand used without renewal for	Bacteria per gram of sand at 37° C.
1....	40 to 60	2 months	288,000
2....	75 to 100	"Several weeks"	710,000
3....	200	2 weeks	28,000
4....	150	1 day	30,000
5....	60	"1 or 2 weeks"	48,000
6....	125	1 month	420,000
7....	50 to 60	1 day	20,000
8....	?	?	216,000
9....	60 to 100	1 day	14,400
10....	100 to 150	1 day	17,000
11....	?	?	374,000
Control samples, average of four tests.....			6,000

The control samples gave counts averaging 6,000 bacteria per gram of sand. The counts obtained from sand used for one day, exceeded 15,000 bacteria per gram. The large number of bacteria present after so short a time, can readily be accounted for by the fact that the old sand is not removed, and mixes with the new, thus polluting it. The counts from sand used for more than one month exceeded a quarter of a million bacteria per gram. To give an instance of the poorest condition found, we cite sand pile No. 2. The cubic capacity of this pile was small and the daily attendance relatively large. Furthermore the sand had not been renewed for several weeks, and was obviously very dirty. It will be seen by referring to the table that the bacterial counts exceeded 700,000 per gram, which is indeed very high.

Tests with Pathogenic Bacteria.

Although the danger of infection from sand piles is mainly one of immediate or direct contact, it was felt necessary to determine how long pathogenic bacteria could survive under conditions which obtain in sand piles. Accordingly four experimental sand piles were set up in the laboratory, two of which were sterilized, and two mixed with laboratory dust.* Twenty-four-hour cultures of diphtheria bacilli, and paratyphoid bacilli, from agar slants, were suspended in salt solution in separate test tubes, and small quantities of each mixed with the sand piles as follows: One cc. of the diphtheria suspension was added to sand pile No. 1 (sterilized), one cc. of the same diphtheria suspension was added to pile No. 2 (mixed with laboratory dust), one cc. of the paratyphoid suspension was added to pile No. 3 (sterilized), and finally, one cc. of the paratyphoid suspension was added to pile No. 4 (mixed with laboratory dust).

Tests conducted for one week may be briefly summarized as follows. In sand piles No. 1 and No. 3, which contained, in previously sterilized sand, diphtheria and paratyphoid cultures respectively, there was no marked

* Laboratory dust, which contains large numbers of bacteria, was added to the sand piles, so that the pathogenic bacteria subsequently added would be subjected to the same sort of biological competition they would undergo in sand piles used by children.

reduction in the number of bacteria present per gram of sand at the end of seven days. The sand piles had been exposed to diffuse light at laboratory temperature (70°F.). In sand piles No. 2 and No. 4, to which laboratory dust containing many bacteria had been added, and which contained diphtheria and paratyphoid bacilli



"A crowded sand pile." (Loaned through the courtesy of Mrs. Robert G. Clarkson.)

respectively, there was marked diminution of these bacilli, though considerable numbers were alive at the end of the seventh day. While it may be argued that the bacteria suffer a continuous reduction of virulence, or that there is a selective dying off of virulent varieties, nevertheless pathogenic bacteria added to sand in sand piles will remain alive and active for a number of days, thus making safeguards necessary.

Disinfection.

For the purpose of study a miniature sand pile was set up, consisting of 300 grs. of white quartz sand. This was sterilized in the autoclave and artificially infected with a pure culture of colon bacilli. This infected sand pile was dried over night in the incubator. A bacteriological count made the following morning showed that there were twenty colon bacilli per gram of sand.

Without giving details of the various experiments it was determined that ten cc. of a solution of calcium hypochlorite, containing one part of avail-

able chlorine to one thousand parts of water, sterilized the miniature sand pile in ten minutes. This sand pile which had been dampened by a quantity of hypochlorite equal to one thirtieth of its volume, dried out in the laboratory (temperature 80 to 85°F.) within three hours.

In practice, the hypochlorite solution should be added at night by means of a garden sprinkling can, thus a more dilute solution might be used since the time of exposure would be longer. There would probably be no odor to the sand the following morning. In case of a slight odor, however, thorough raking of the sand would remove it. The minimum quantity of liquid to be added should be one thirtieth of the volume of the sand, so as to insure thorough contact with the chemical. It might be thought that sand piles if exposed to the sun would be continually disinfected. As a matter of fact the sun does not penetrate deeply enough to produce marked results. Sand pile No. 11 was continually exposed to the sun, yet the counts reached 374,000 bacteria per gram. Furthermore, sand piles exposed to the sun subject the children to needless discomfort.

Conclusions.

1. Sand piles are considerably polluted, as indicated both by observation and bacteriological analysis, and may be, therefore, sources of immediate contact infection.

2. Diphtheria bacilli, paratyphoid bacilli, and probably, therefore, other pathogenic bacteria, can live for several days in sand piles, and even though they may suffer reduction both in virulence and number, the mere possibility of their presence and persistence is indicative of the necessity of safeguards. Hence sand piles may be sources of infection over more or less prolonged periods of time, as well as by immediate contact.

3. White quartz sand, instead of building sand, should be used for sand boxes.

4. Sand boxes should be protected at night from stray cats and dogs, by means of wire screens.

5. The sand should be placed over boards to insure rapid drying.

6. Before adding new sand, the old should be removed, or at least thoroughly cleaned.

7. Children with soiled diapers and children with noticeable infections should be excluded.

8. The sand should be treated every night with a disinfectant. A quantity of one to a thousand hypochlorite of calcium solution equivalent to one thirtieth of the volume of sand, will kill none-sporebearing organisms in ten minutes.

REPORT OF THE STANDING COMMITTEE ON MORBIDITY STATISTICS.

SECTION ON VITAL STATISTICS, AMERICAN PUBLIC HEALTH ASSOCIATION, JACKSONVILLE, FLA., 1914.

COMMITTEE.

John W. Trask, Assistant Surgeon General, United States Public Health Service, Chairman.

Chas. F. Bolduan, Director, Bureau of Public Health Education, Department of Health of the City of New York.

Wm. H. Davis, formerly Vital Statistician, Boston City Department of Health.

F. S. Crum, Assistant Statistician, The Prudential Life Insurance Company of America, Newark, N. J.

John B. Andrews, Secretary, American Association for Labor Legislation, New York, N. Y.

YOUR committee on morbidity statistics in making this, the first committee report on the subject, thought that it would best serve the purposes for which it was appointed by discussing and reporting for your consideration the following:

1. The relationship of morbidity statistics to morbidity reports.
2. The nature of morbidity reports.
 a. The reasons for requiring them.
 b. When, by whom, and to whom case reports should be made.
 c. The nature of data to be given in morbidity reports.
 d. Form of schedule or report blank.
3. The work of the health department upon receipt of case reports and the uses (other than statistical) to be made of these reports by the health department.
 a. Verification of the diagnosis and essential data of case reports.
 b. The obtaining of supplementary epidemiologic data.
 c. The uses to be made of case reports in the control of disease.
 1. Infectious diseases.
 2. Occupational diseases.
 3. Venereal diseases.
 4. Diseases of unknown origin.
4. Statistical treatment of reports of infectious diseases, the information to be derived therefrom, and the uses thereof.
5. Statistical treatment of reports of occupational diseases and injuries, the information to be derived therefrom, and the uses thereof.

Your committee therefore begs to submit the following report:

Morbidity statistics are obtained by the collection and numerical classification of data relating to recorded cases of disease. The principal source of this information is the official records of notifiable diseases obtained primarily from the reports of practising physicians. In considering morbidity statistics we need first to consider the

morbidity reports from which they are derived.

The practice of requiring the notification of cases of the controllable diseases owes its existence to the assumption that communities desire to prevent the occurrence of these diseases and are responsible in a way for the cases that occur.

The Reasons for Requiring Morbidity Reports.

The reasons for requiring reports of cases of the controllable diseases are:

1. That the interests of the patient may be protected and that he may receive suitable and proper care and treatment.

2. That the disease may be prevented from spreading from the patient to other members of the community.

3. That the factors or conditions that produced the disease in the patient may be removed, or so modified that they will not do similar injury to other members of the community.

4. That, by recording facts in regard to the time, place, and conditions of occurrence of cases of diseases, knowledge of their causes or means of spread hitherto unknown may be obtained which will be of value in the control of these diseases.

5. That, by having a means of promptly learning of the occurrence of disease, the community may have a current indicator of the status of the community as relates to disease and of the efficiency of its sanitary work.

6. That the compiled, classified, and analyzed records in the form of morbidity statistics may give to the community a record of the relative prevalence of disease from year to year and under varying conditions, and show the effect of public health measures and of sanitary work.

These being the purposes of the notification of cases, morbidity reports presuppose the existence of an agency which, upon receipt of the case reports, uses them for the protection of the patient or the community. Health departments and morbidity reports go together, each is useless without the other. The health department is helpless without the knowledge of the occurrence of disease given only by case reports, and case reports have no object unless there is a health department to act upon the information which they give.

The use of case reports for the protection of the patient is becoming more and more common. An illustration of this use is the requiring of the reporting of all cases of ophthalmia in the newborn for the protection of the eyesight of those affected. Every case of ophthalmia neonatorum should be under the observation of the health department to the extent that it may be ascertained that proper treatment is being given and if necessary it should conduct the treatment itself. Vision is too important to the individual and its loss too great a misfortune to run any risk of the sight of helpless infants being damaged due to the neglect of their responsible adult guardians, and in this sense the health department and the community at large, as well as the immediate household, must be considered as constituting the guardians.

Since it has been learned that the

early use of diphtheria antitoxin has an important bearing upon the recovery of those affected with diphtheria, many communities have adopted the practice of furnishing antitoxin, more particularly to those who would not be likely to use it because of the expense. Every case of diphtheria should be under the observation of the health department to the extent that it may know that the patient's interests are being protected and that he does not fail to receive antitoxin because of ignorance or poverty.

Communities have begun to assume the responsibility of providing for consumptives who, because of the expense, would otherwise not have necessary care and proper surroundings. Such a plan can be carried out systematically only when all recognized cases are reported.

Epidemiologic studies have demonstrated that infectious diseases are directly or indirectly communicable in various ways, that some of these diseases are spread from person to person by obscure and devious routes. To such an extent is this true that the danger of an individual's contracting disease from the sick he knows of among his associates and neighbors is frequently less than the danger from the many sick of whom he has no knowledge and of whose existence he is unaware. Children in day schools and Sunday schools are exposed to the communicable diseases of many homes. In street cars and at churches we come into contact with those from distant households. The common fly makes neighbors of us all. The purpose of the health department is to protect the individual from infection through the spread of disease from the sick of whom he has no knowledge and against whom he is unable to protect himself. It is further the function of the health department to protect the individual from remediable disease-producing agencies. This protection can be extended only by the aid of the information furnished by case reports.

There is a class of diseases and disabilities which are not communicable but are due to remediable conditions. Examples of this are the diseases known as industrial or occupational. The only means by which the conditions which produce these can be discovered and remedied is by recognizing the cases as they occur and ascertaining the place at and conditions under which each was produced. To prevent occupational diseases it is necessary first to recognize the disease, then discover the conditions which produced it, and finally render the conditions harmless for further injury. If we do not recognize the disease, we cannot know that it exists. If the disease is recognized and not reported to those responsible for its control, the disease might as well not have been recognized, so far as the community's welfare is concerned. If the authorities have been informed of the existence of the case and take no measures to make it impossible for others to be similarly injured, the recognition and notification of the cases have been in vain.

Incidentally the accumulated records of cases of disease show its prevalence and the conditions under which it occurs, for disease is as widespread as

cases, and there is no distinction between the prevalence of disease and the occurrence of cases. These accumulated records have been and will continue to be of value in revealing epidemiologic facts regarding disease and of service in ascertaining the causes of disease of unknown origin. They have shown the changing virulence of disease under varying conditions of season and climate, and at different times. Used with mortality records they have shown the effects, or the absence of effect, of medical or other treatment upon the course of disease.

Accumulated in masses, compiled, classified, and analyzed, case records constitute morbidity statistics. The experience of an individual, or of one community, or of a large population for one year, cannot give a comprehensive picture of a given disease, and if we are to know disease, the conditions under which it occurs, its effects, its fatality rates, and, for that matter, also the effects of treatment, it can be only through a study of the conditions under which cases occur, their course, and termination over a period of time, in many localities, and as observed by many people. This constitutes morbidity statistics. It is upon this that the future, not only of public health and preventive medicine, but of the practice of medicine itself largely depends.

To Whom, by Whom, and When Reports Should Be Made.

To Whom Reports Should be Made.—Cases should be reported to the health department inasmuch as the purpose of case reports is to give to that department information by which it can protect the community or, in some instances, the patient himself. A peculiar provision will be found in a number of state statutes requiring that cases of ophthalmia neonatorum shall be reported to a practising physician. Such a requirement is anomalous, for the physician has been given no official responsibilities. The physician does not represent the community. The only representative of the community in such matters is the health department or some official designated for the purpose.

By Whom Reports Should be Made.—Reports should be made by those able to recognize cases. In the practising physician we have one presumably able to recognize cases of the notifiable diseases and also one who, because of his work, comes in contact with such cases. Under the present organization of society and in view of existing customs the person upon whom the responsibility for the reporting of cases of the notifiable diseases must, in most instances, be placed, is the practising physician, although it may be desirable to include others in this responsibility, such as the head of the family or household, or the attendant or nurse, and to require that in the absence of a physician one of these shall make the report. As a matter of fact, when the requirements as regards physicians are enforced the reports made by the others will in most instances be quite immaterial.

When Reports Should be Made.—Cases should be reported as soon as recognized, and for many diseases as soon as suspected. Each health de-

partment should have in its employ an expert diagnostician of the notifiable diseases. The physician will be doing the community and the health department the greatest service by reporting a case as soon as it is suspected to be of a notifiable nature. The diagnostician of the health department can in the interests of the community observe the case and determine its nature.

The Nature of Data to be Given in Morbidity Reports.

In the future, when civilized man determines to protect himself from disease with the same care that he now takes to protect himself from the armed forces of rival nations, the data which will be recorded of each case of controllable disease recognized will be in considerable detail. For the present, however, while we have much to learn as regards the control of disease, and with the existing standards of medical training, it is impracticable to require anything but the most essential data and those which are most easily furnished and most likely to be accurate. The following may be considered to include all the data which can be properly asked of the practicing physician and which are likely to be furnished in a manner worthy of record.

The date when the report is made.

The name of the disease or suspected disease.

The name, age, sex, race, occupation, address and school attended or place of employment of the patient.

Number of adults and of children in the household.

The physician's opinion as to the probable source of infection, or of the origin of the disease.

If the disease is smallpox, it should be stated whether it is of the mild type or the virulent type, and the vaccination history of the patient should be given.

If the disease is typhoid fever, scarlet fever, diphtheria, or septic sore throat (diseases spread through milk) information should be given as to whether the patient was, or any member of the household is at the time of the report, engaged in the production or handling of milk.

The reporting physician should sign his name and give his address.

There are many diseases in which the efficient health department will want to have much more detailed information regarding each case. The practicing physician, however, should not be asked to give this information. The health department's representative is the only person who can be expected to be properly trained to ascertain accurately in such instances detailed epidemiologic data. In fact, the well equipped health department would not be willing to depend upon the epidemiologic data furnished by practicing physicians in general, most of whom have had little experience or training in this kind of work.

Form of Schedule or Report Blank.

The most convenient form of report blank is believed to be the postal card. This does not require the addition of postage, a thing which the physician should not, when practicable, be asked to furnish.

Statistical Treatment of Reports of Infectious Diseases, the Information to be Derived Therefrom, and the Uses Thereof.

1. Information to be Derived from Reports of Infectious Diseases.

In the provisions of the Model State Law for morbidity reports the following facts, susceptible of statistical treatment, are required:

1. Date of report of sickness.
2. Name of disease or suspected disease.
3. Age of person reported.
4. Sex of person reported.
5. Color of person reported.
6. Occupation of person reported.
7. Address of person reported.
8. Source or probable source of infection, or the origin or probable origin of the disease.
9. In cases of smallpox, number of successful vaccinations, and dates of such vaccinations.

It will be observed that the facts required are quite limited, but, if fully reported, they will serve admirably as a guide to the quantity of infectious disease in any given locality, the time of minimum and maximum occurrence, the age at which susceptibility is greatest, whether or not there are important sex differences, and whether or not negroes are more or less susceptible than whites to the various infectious diseases. The occupation factor is of less value in infectious diseases than in occupational diseases, but it conceivably may be of value in enabling us to measure the relative attack incidence in certain occupations or professions. For illustration, the special hazards incident to nurses and physicians engaged in treating highly contagious diseases such as smallpox and diphtheria can ultimately be quite accurately determined on the basis of case reports under the Model State Law. Perhaps the term *Race* might profitably have been substituted for *Color* in the Model Law. The reports will often read "colored" and in such cases it will frequently be impossible to determine whether the reported person is Negro, Indian, Chinese or Japanese.

Provision is made in the Model State Law for securing information that will make it possible in the future to determine more positively than in the past the value of vaccination as a prophylactic measure in smallpox. The State Law might have gone a step further and required the same information in cases of typhoid fever. Antityphoid vaccination is becoming quite general in certain sections of the country and it is highly desirable that information as to the immunity secured by this treatment become available at the earliest moment possible.

2. *Statistical Treatment.*

The statistical treatment of morbidity reports should be such as best to serve two general purposes. First, to provide the local health authority with first-aid information which will enable him to set in motion the activities necessary to check the spread of the infectious diseases which are found to be present in the community, to assist so far as possible in the proper treatment of the notified cases, and to remove the source of the disease so far as practicable. This kind of work can only be performed effectively by the local health authority when complete and early reports of sickness cases are available to him. Obviously, such reports should greatly increase the efficiency of the local health authority in its chief function which is to conserve the health of the community. Early knowledge of the appearance of an infections disease is possible only when reports of cases are completely and promptly reported by the attending physicians. The local health authority has only to assemble these reports by diseases and localities to get the

knowledge necessary to set in motion his prevention activities. A statistical device quite generally used for this purpose consists of colored pins and maps. With this device the exact location and number of cases of the various infectious diseases present in a given community can readily be shown in a simple but graphic manner. This method is especially adapted to small cities. In large cities the same purpose may be achieved by assembling the reported cases on cards arranged by streets. For this immediate purpose, the health authority does not need to consider factors of age, sex, race, etc. He is primarily interested in the kind of infectious disease, the number of cases, and the exact location of the same.

The second purpose of statistical presentation of infectious disease reports is to put the morbidity experience in such tabular form that all the essential items may be readily compared in time, that is by days, weeks, months, and years; and in place, that is, by geographical or other divisions such as streets, wards, cities, counties and states. In these permanent tabulations it is important that sex and age be carefully distinguished and also, wherever the race factor is of sufficient importance, it should be taken into account.

As there is no provision in the Model State Law for a second report by physicians to notify the termination of cases by death or cure, we cannot hope to secure information as to the relative duration of the various notifiable diseases. The case fatality-rates of infectious diseases can be calculated if the reports of cases are complete. The true case fatality-rates, however, cannot be calculated by weeks and months unless the fatal cases are measured against the non-fatal cases of the week or month of first-notification. At present the method in common use is to measure fatal cases against cases notified the week or month that the deaths occur. This gives untrue results and the distortion of facts is likely to be considerable when an epidemic is on the wane.

3. *Uses of Statistics of Infectious Diseases.*

I have already hinted at some of the uses of statistics of infectious diseases. First of all these statistics enable the local health authority to check the spread of contagious disease by giving him information as to the place of their occurrence. Secondly, when tabulated by weeks, months, and years, seasonal fluctuations can be noted and possible periodicity of occurrence can be discovered. In that event an epidemic year might be anticipated and to be forewarned is to be forearmed.

Thirdly, by noting the factors of age, sex and race the attack incidence of a given disease can be calculated, its comparative case fatality by age, sex and race can be determined and more definite knowledge can be had of the effects of the various diseases—under what conditioning circumstances of time, place, age, sex and race a given disease is apt to be most prevalent or most fatal. Obviously the knowledge of these facts will be of great value to health authorities in any campaign of disease prevention.

Fourthly, by comparison of the prevalence of the various diseases, their increase or decrease, and the relative effects of preventive methods of various kinds, the health authorities may finally come to an agreement on the best preventive methods applicable to the specific infectious diseases. For illustration, a careful analysis of a large body of statistics ought to enable us to determine with more accuracy than has heretofore been possible the relative value of sanatorium treatment of tuberculosis.

Fifthly, in the statistical treatment of such a disease as smallpox the value of vaccination as an immunizing agent can be definitely determined on the basis of large numbers, for it is assumed that the local statistics will in most cases be ultimately combined in state reports, which in turn will be consolidated in national tables which will include the data from the entire morbidity registration area.

Statistical Treatment of Reports of Occupational Diseases and Injuries, the Information to Be Derived Therefrom, and the Uses Thereof.

1. Legislation.

Accidental injuries occurring in factories and workshops have been reportable for some years in at least twenty-five states, the reports in a few instances tobe made by physicians but in practically all cases by employers, and to be sent to the state labor departments. Beginning in 1911 reporting has been further emphasized in many states by workmen's compensation laws. In two or three of these states notification to compensation commissions relieves the employer of further obligation to report. Most mining states also require accidents in mines to be reported, usually to the mine inspection officials, and in no fewer than thirty-three states accidents on railroads and other public utilities must be reported to a public service commission. Railroad accidents are also reportable to the Interstate Commerce Commission.

Within the past five years fifteen states have provided for the reporting of occupational diseases. No less than five of these states require monthly medical examination of employees in especially unhealthful employments such as the manufacture of white and red lead, and also make it the duty of the examining physician to send reports to the proper state authorities. In the remaining ten states it is the duty of all physicians to report to state authorities certain specified occupational diseases and in three of these any other ailment or disease which the physician believes to be due to the nature of the employment is likewise reportable.

2. Standard Schedules.

In 1911 the American Association for Labor Legislation, after numerous conferences with public officials and practical safety and sanitary engineers, drafted standard schedules for the uniform reporting of industrial accidents and occupational diseases.

Nearly one-half of the total manufacturing population of the United

States is now working under the standard schedule for accident reports. Among the leading states which have already adopted this standard form are California, Iowa, Massachusetts, Minnesota, Nevada, New Hampshire, New York, Pennsylvania and Washington. The standard form has also been adopted by a number of manufacturing corporations and insurance companies, while several influential organizations have endorsed it and are now working for its general adoption.

The standard certificate for occupational disease reports has been adopted by no less than nine states, including California, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio and Wisconsin.

3. *Proposed System for Uniform Tabulations.*

At a convention of the International Association of Labor Commissioners held in Washington, D. C., in 1912, the writer suggested a plan for uniform tabulation of industrial injuries.

At no time in our history has there been a greater demand for reliable information prepared and presented in a form which will make it possible to compare the experience of one state with that of another. This interest, which is nation-wide, applies to nothing more urgently than it does to the closely related problems of industrial accidents and occupational diseases. To meet the need for information treated from the national industrial point of view it is believed that the best solution is that the states place in the hands of the federal authorities selected portions of their data for treatment. To this end the following plan has been outlined:

(1) Definition of a reportable accident as one (a) causing death immediately or later; or (b) causing some permanent injury; or (c) causing absence from work for twenty-four hours or longer. The report should be made within forty-eight hours of the accident, and employers should be urged to keep a record of, although not to report, all cases where the workman is off less than twenty-four hours.

(2) Adoption in coöperating states of a form of report conforming in essentials to the standard schedule.

(3) Securing from industrial establishments, for the use of the state and of the federal bureau of labor statistics, information on the following points: (a) employment—if possible, the shop hours of the different departments, or, if this cannot be obtained, the average number employed per month and the exact number of days during which the department was in operation; (b) accident occurrences, including length of temporary disabilities.

(4) Treatment of this material by transferring each record as it is completed to punched cards under a uniform code to be agreed upon, the cards to be tabulated by each state and then transmitted to Washington, or else the federal bureau may undertake to perform the tabulation for the coöperating states in return for the opportunity to combine the data for its own uses.

(5) Publication of the data thus secured in such a way that it shall be

comparable between the various co-operating states and from year to year.

4. Information Secured.

The information secured through proper systems of notification of industrial accidents and occupational diseases may be grouped under the following heads, as formulated in the standard reporting bills drafted by the Association for Labor Legislation and already adopted in several states:

(1) *Accident Reports.*

(a) Name, address and business of employer.

(b) Name, address and occupation of employee.

(c) Cause of injury.

(d) Nature of injury.

(e) Time of injury.

(f) Place of injury.

(g) Such other information as may reasonably be required by the proper official.

(2) *Disease Reports.*

(a) Name, address and occupation of patient.

(b) Name, address and business of employer.

(c) Nature of disease.

(d) Such other information as may reasonably be required by the state board of health.

These main heads are capable of detailed expansion to embrace all the data called for by the standard schedules and certificates already referred to.

5. Utilization.

Every person in the community is directly concerned in scientific efforts to conserve the health, vitality, energy and industrial efficiency of wage-earners. In order that the necessary mechanical and other precautions may be taken, the state should be enabled to determine where and how men are exposed to the industrial perils which menace them. The legislation here outlined is part of a country-wide organized effort to arouse more active interest and coöperation among employers, employees, physicians and inspection officials, and to secure for the use of factory inspectors a regular supply of information from those who should be best informed on actual conditions. Information thus secured should indicate the danger spots and the disease foci of industry, and factory inspectors, instead of being mere detectives, can become helpful coöperators in the field of industrial safety and hygiene. They will be in a position to suggest to manufacturers requisite, and in many cases simple and inexpensive, safeguards, and to instruct employees in the use of measures for the prevention of unnecessary suffering and death.

Most potent among the factors pressing for the better reporting of the accidents and diseases of industry is the rising tide of workmen's compensation legislation, which within five years has spread to twenty-four states, or exactly one-half of the country. Only two large areas—the solid south broken only by Kentucky, Louisiana and Texas, and a Rocky Mountain strip extending eastward over the Dakotas—are still backward and untouched by the forward-sweeping wave. The vast majority of the manufactur-

ing population of the country is now covered by this protection. Already in Massachusetts occupational diseases as well as accidents are embraced in the compensation law. Justice demands that other states include at an early date provisions which shall indemnify those incapacitated by occupational disease no less than those incapacitated by accident. With compensation legislation has come at last the certainty as well as the necessity for accurate and scientific reporting. Scientific tabulation of results then becomes a vital issue. The greatest function of compensation laws, the *prevention* of industrial disabilities, as well as the nominal function of rendering financial amends for those disabilities which nevertheless do arise, must be halting in its operation in the absence of a system of accurate, complete and comparable statistics such as is aimed at by the proposals here made.

Book Reviews.

The House-Fly, Musca Domestica Linn.: Its Structure, Habits, Developments, Relation to Disease, and Control. *C. Gordon Hewitt. Cambridge: The University Press, 1914. 15+382 pp., 104 ill., 8 vo. G. P. Putnam's Sons, New York. Price, $4.50.*

Amid the growing literature covering the insects that share our homes, the present work will take an important place by reason of its completeness.

There are no less than fourteen species of flies that frequent houses, but the house-fly proper, named by Linnæus *Musca domestica*, is usually by far the most abundant. When large numbers of flies in a given locality have been examined, the proportion of *M. domestica* to other species has been found to be from 87.5 to 98.8 per cent. Hence this book is chiefly devoted to the common species, but the others are not neglected.

The scope of the work may best be indicated by a summary of the contents of the six parts of which it is composed.

In the first part there is a description of *M. domestica*, and a detailed account of the anatomy of the adults and of its distribution and habits in regard to food, temperature, and the like. The second part takes up the breeding habits, life-history, and the anatomy of the larva of the same species. In the third part we find an account of the enemies of the house-fly and its parasites. The other species that frequent houses are treated more briefly in Part IV. Then follow two parts of especial interest to sanitarians. The first of these treats of the dissemination of pathogenic organisms by flies,—one of the six chapters in this part being devoted to typhoid fever and another to the summer diarrhea of infants. The concluding part deals with the means of preventing the breeding and spread of flies, and with organized efforts to control them.

The anatomical part of the book is perhaps the least satisfactory. It would be better if the chapters dealing with the anatomy of the adult and of the larva were brought together. Some of the anatomical descriptions are hard to follow. This is particularly true of the account of the mouthparts of the adult, which is unintelligiable for any one not an entomologist, and should be rewritten.

One of the most interesting and instructive chapters is the one on the feeding habits of the house-fly, including, as it does, some valuable, if unpleasant, original observations by the author on the nature of fly specks.

The part on the enemies and parasites of the fly appears to be full and adequate. It deals with the habits and life-histories as well as the adult structure of these useful organisms. The most important of these checks on the increase of flies seems to be the familiar fungus, *Eupusa muscæ*. The closeness of the association of the house-fly with the horse is shown by the fact that the former is the intermediate host for a nematode worm that finds its definitive host in the latter.

Of special interest and value is Part V, occupying about a third of the book. Here is set forth in detail the evidence against flies as carriers of the germs of disease. This part gives a useful summary of the extensive literature on the subject. In this connection, however, it should not be forgotten that flies in themselves are not dangerous. They become so only when allowed access to excretions that contain pathogenic organisms. The first problem of sanitation, therefore, is the control of dangerous excretions. The control of the fly is secondary.

The book is well printed on paper with a dull finish pleasant to the eye. Most of the illustrations are original and are well drawn, but in some cases the labeling and the descriptive legends are inadequate. The colored plates are so good that one wishes there were more of them.

Although not intended for a popular treatise, this book deserves a wide circulation; and it should be read by all who are interested in municipal or rural sanitation.

R. P. Bigelow.

Public Health in Springfield, Ill. *By Frank Schneider, Jr. A Survey published by the Department of Surveys and Exhibits of the Russell Sage Foundation. New York, 1915. Price, 25 cents.*

A number of surveys of health conditions in different American cities have appeared in recent years and several by the author of "Public Health in Springfield" but this is among the best. The report is well arranged, proceeds logically, is easy to read and though containing less than 150 pages, with appendices, has both table of contents and index.

The relation of the character of the population to health is discussed and while Springfield has a smaller proportion of foreign-born and negroes, than eastern and southern cities, these groups are concentrated in certain wards and this goes far to explain the greater mortality in these districts. Infant mortality properly receives first attention as affording the most promising field for life-saving. Its causes and variations in different parts of the city are well analyzed and the author's contention is well founded, that by proper preventive measures, chiefly baby welfare stations and visiting nurses, the infant mortality rate can be nearly cut in two. Of course, complete birth registration is a prime requisite and the fact is wisely emphasized, that, even if it led to no life-saving, the record of the birth of each child is imperatively demanded for the maintenance of its social and legal rights.

The control of the common contagious diseases of children is well handled and the advice given is eminently practical and evinces a familiarity with our latest knowledge of the subject. Prompt reporting, while an essential, accomplishes little, unless there is efficient control. The trained epidemologist and the visiting nurse are what counts, that is, prompt personal investigation and direction of each case by skilled men and women. The time has gone by for mere profunctory visit by a "sanitary inspector" and a "disinfector."

Then follow chapters on tuberculosis, typhoid fever and venereal diseases, the one on tuberculosis being by Mr. Van Blarcom, and forcefully urges the accepted methods of control such as education, a hospital, a dispensary, open-air schools and nurses. The chapter on typhoid fever shows that the former excess of this disease was due to a polluted public water supply the improvement of which caused a marked reduction in the typhoid death-rate. There are, however, 7,530 surface wells in this city of less than 60,000 people, and 7,431 privies, and it is difficult to see how a typhoid death-rate of less than 20 per 100,000 can be maintained under these conditions. That it has been so reduced is remarkable and speaks well for the intelligence and personal habits of the people, characteristics, however, upon which the tolerance of these conditions would throw doubt! To combat the venereal peril are recommended conservative education, notification, laboratory diagnosis, and free dispensary and hospital service.

The author divides his subject into a consideration of the control of infection in persons and the control of inanimate environment. In the latter, as in the former part, he insists on essentials. The water supply must be pure and adequate so that there may be no excuse for surface wells. While the necessity for ultimate sewage purification is recognized, the prompt removal of all privies is a more presing demand. The milk supply must be improved and efficient inspection maintained and pasteurization is recommended. The greatest danger in handling other foods is fecal contamination, and the menace of improper toilets and privies, in and near bakeries and stores, is forcibly touched upon. Improper disposal of stable manure is also strongly condemned but not much is said about garbage disposal, street sweeping or "clean up" weeks, matters which have little to do with public health.

It is interesting, though not surprising, that Mr. Schneider, who is not a medical man, should give so much more attention to persons than to things in public health work. The fear has been expressed that non-medical men would do quite otherwise. While Mr. Schneider would not venture to diagnose an ailment in man he does diagnose most successfully the ailment of communities and recommends the appropriate remedies which involve, for their chief functions, the employment of physicians and nurses skilled in the diagnosis and treatment of the diseases of persons. He even goes much farther than many, but no farther than he should, when he advises the assumption of the general care of the sick poor by the health department as economical and bringing to the latter much useful

knowledge of disease and affording new opportunities for preventive work.

Mr. Schneider has evidently read many of the voluminous sanitary codes made to order, for he says: "It would seem, however, not so important to have a new code complete in every particular (many provisions of which could not be enforced with the present staff), as that the health officer be able to have ordinances passed as needed authorizing work he especially wishes to prosecute."

The whole review is especially noteworthy for its careful estimate of the efficiency of the suggested methods of disease prevention. The relation to cost also receives due attention. It is shown that the city had better spend money for epidemiologists and nurses than remodel its old contagious disease hospital if money cannot be spared for both. It is also argued that important though they are, the betterment of the water and the extension of the sewers should be postponed until the health department is put on a modern basis, for the latter will save more lives, and at a less cost, than the former.

Lastly Mr. Schneider urges a combination of county and municipal health departments as being the best and most economical for that particular community.

Charles V. Chapin.

An Introduction to School Hygiene. *By W. B. Drummond. Longmans, Green & Co., New York and London.*

This book, which is intended especially for teachers, is written in the clear, incisive style which characterizes all of Dr. Drummond's well known books. He has already published a treatise on physiology for teachers so that this subject is not touched upon in the present work. The book was written for the English school teachers and a number of conditions exist in the British schools which are not found in American school-rooms. As an instance, the arrangement of meals in this country does not include the inevitable five o'clock tea which is a part of the daily life of all classes and all ages in England.

In discussing the age at which children should go to school, Dr. Drummond states emphatically that he does not believe that any child should be permitted to attend school previous to six years, and preferably seven. In France the school age is six, while in Scotland it is five. It is well known that the chronological, physiological and anatomical ages differ in almost every case, and a child who is ten chronologically may not be more than four or five physiologically.

The chapter devoted to the teeth should be read by every teacher and the principles thereof instilled into each home. The importance of caring for the teeth of young children is becoming more widely recognized and its effect on the development and nutrition of later life is now well established. It is not an exaggeration to state that the prevention and treatment of dental caries is one of the biggest problems of child hygiene.

The chapter on the study of children, and the one on the day's work, can be read with profit by every school teacher and it is hoped that this book will obtain a wide circulation in this country. It is helpful and instructive to a very great degree and can be highly commended by school physicians to the teachers under their jurisdiction.

Henry L. K. Shaw, M. D.,
Albany, N. Y.

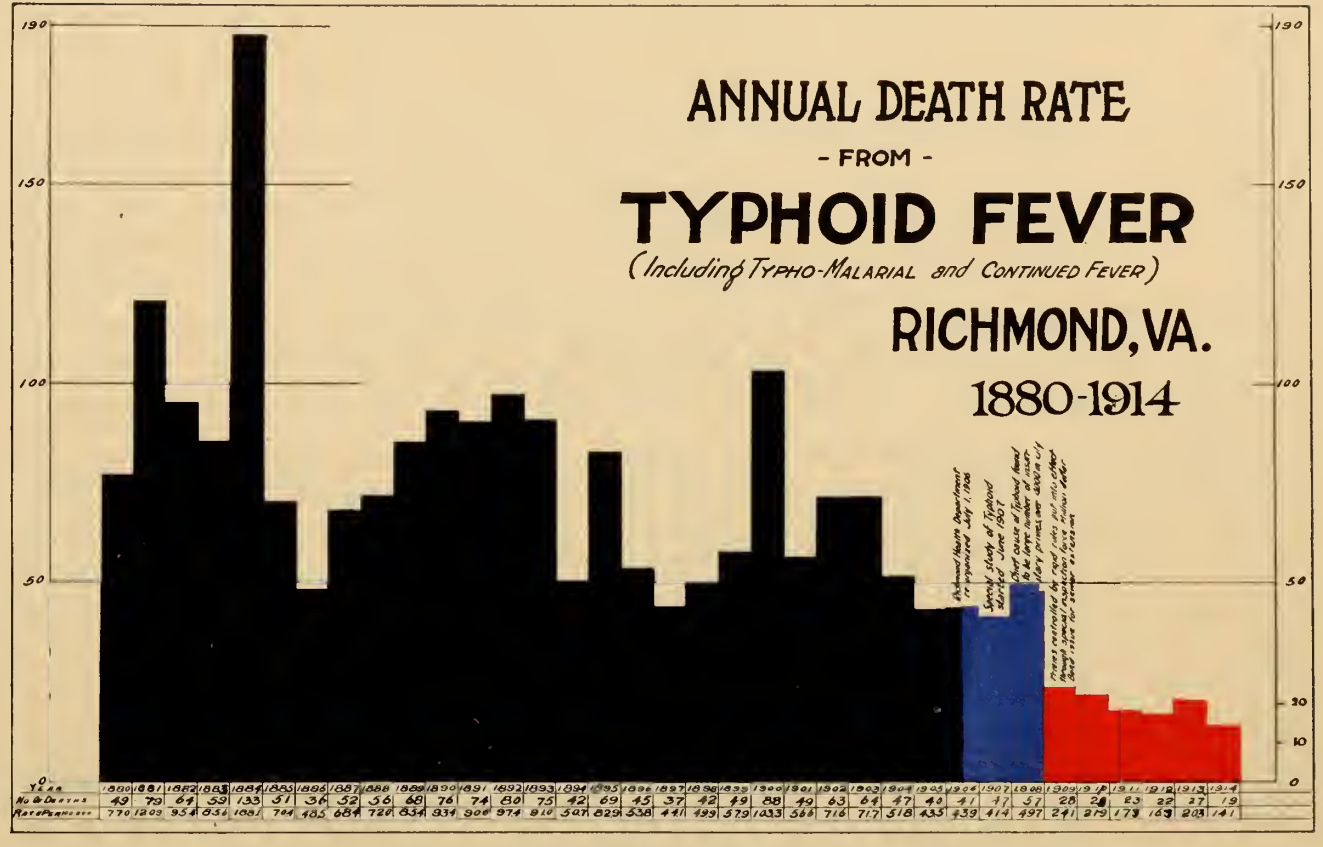
Health Department Reports and Notes.

REPORTS.

Jacksonville, Florida.

Dr. C. E. Terry, health officer of Jacksonville, commences his report with the following statement: "Were it a financial statement of a bank holding the deposits of even a small percentage of our citizens, or a balance sheet devoted to pecuniary revenues of any description; did it present to the individual as efficient means for the protection of his dollars as for that of his life and health, its pages would doubtless be eagerly scanned, the methods employed carefully studied, and it is even conceivable that the results set down might receive some degree of commendation as an economic system of interest and value. Dealing as it does, however, not with an advance in property values or capital accumulations, but with an increase in community health, and a saving of individual lives, it is extremely doubtful if the popular demand for copies will exceed one half of the limited edition available." While Doctor Terry's pessimistic view is undoubtedly true, it is certain that the health officers of the country could in many instances receive much benefit through a careful perusal of this admirable report. The population of Jacksonville for 1914 was 70,173, almost equally divided between white and colored. The crude death-rate for the year was 18.5 and the resident death-rate 15.2. It is pointed out that this is the lowest rate yet published for Jacksonville. The plan adopted in 1913 for the control of diphtheria through an active search for and the segregation of carriers among case contacts, in the schools and in the homes, has been continued with apparently good results. One of the marked advantages of the scheme is that its carrying out accomplishes public instruction concerning disease carriers in general. This has led to the early detection of cases of the disease in several instances. It will be recalled that the infectious disease hospital of Jacksonville is conducted on the contact infection idea, disregarding air transmission. The head nurse, Miss Laura J. Harris, reports on eighty-one cases of disease which were treated at the hospital. All of these patients were cared for on a single floor by the same nurses, the doors of the rooms into corridors remaining open. The only case of cross infection which occurred was one of chickenpox. This was due to carelessness on the part of one of the nurses. Doctor Terry states that he feels that the value of the sanitary privy law has been demonstrated beyond all possibility of a doubt. There was a slight increase in typhoid fever in the city during the year, but this is explained on account of the fact that typhoid was prevalent in a number of the nearby communities. The enforcement of a midwifery ordinance in 1914 has been accompanied by a marked decrease in the deaths occurring in the "tetanus period." Doctor Terry points out that, although it is too early to draw conclusions, he is inclined to believe that the reduction may be attributed to the regulations surrounding the practice of the midwives, their close supervision by the colored district nurse, and the use of sterile umbilical dressings furnished by the department. One of the most interesting sections of the report is that dealing with habit-forming drugs. It will be recalled that in addition to the usual provisions of the anti-narcotic laws, Jacksonville has an ordinance providing that physicians shall send copies of all prescriptions which call for these drugs with the name and address of the user to the Health Department. Also that the health officer may, if he deem it advisable, write prescriptions for indigent users. The records show a total of 1,073 habitual drug users. It is proposed at the next state legislature to again introduce a bill which will deal adequately with the various aspects of this great problem. Space prohibits detailed mention of the excellent report of the bacteriologist and chemist, and milk and dairy inspector. The section dealing with vital statistics is of the usual excellence of Jacksonville reports.




ANNUAL DEATH RATE
- FROM -
TYPHOID FEVER
(Including Typho-Malarial and Continued Fever)
RICHMOND, VA.
1880-1914
190
150
100
50
0
30
10
Richmond Health Department reorganized July 1, 1908
Special Study of Typhoid Started June 1907
Best cause of typhoid found to be large number of insanitary privies over water in city
Privies controlled by rigid rules put into effect through special regulations here noted
Year
No. of Deaths
Rate per 100,000

Richmond, Virginia.

The Forty-third Annual Report of the Richmond Health Department, the ninth report to be made by Dr. E. C. Levy as chief health officer, presents much valuable information and is made unusually attractive through the introduction of excellent colored charts. The chart showing the typhoid fever record since 1880 is reproduced here. Doctor Levy states that the year 1914 was beyond question the most successful that the department ever had. The facts presented certainly bear up the health officer's contention. The general death-rate was the lowest on record and the same is true of the death-rate from typhoid fever, diphtheria and infantile diarrhea. About thirteen square miles of territory, with a population of approximately 18,000, was added to the city the latter part of the year. The general death-rate was 19.7 with non-residents included, and 17.8 with the non-residents excluded. The typhoid fever death-rate per 100,000 was 14.1. It is interesting to compare this with the annual average of 1907 to 1909 when it was 38.4. The death-rate from diarrhea under two years was 71.9 and contrasted with 130.2 the annual average from 1907 to 1909. Mr. A. H. Straus, who has served as bacteriologist on part time during the past five years, resigned to accept a professorship at the Medical College of Virginia. On the recommendation of the health officer the Board of Health sent to the city council an ordinance increasing the salary of the bacteriologist to $2,000 a year, and making the office a whole-time one. An interesting feature of this ordinance is that it contains a provision whereby the Board of Health, in view of the importance of the work and of the technical training demanded, was empowered to employ a bacteriologist not a resident of Richmond in the event of their being unable otherwise to fill the office in a satisfactory manner. Doctor Levy in commenting on this states that he believes that it is the first instant in which it has been made legal in Richmond to fill any city position except with a "citizen and taxpayer." He hopes that this is but the beginning of a realization that city offices are, or should be, primarily for the benefit of the city and not of the office-holder. The health workers of the country will agree with Doctor Levy in this matter. Doctor Levy continues in this report his excellent plan of giving a brief history of all deaths from typhoid fever in the city during the year, with special reference to where the disease was contracted, etc. There was only one death from malaria in the city during the year. Doctor Levy reiterates his statement that the high malaria rates prior to 1908 were entirely fallacious and that the deaths recorded were either from consumption or from some obscure condition which was not recognized by the attending physician. The low death-rate from diphtheria (3 per 100,000) has undoubtedly been due very largely to the work done by the Health Department. The chief factors concerned have been the valuable work of the laboratory, the policy of liberal distribution of antitoxin, the careful investigation by the medical inspector of every reported case, and the policy of furnishing an expert consultant in laryngeal cases. 1914 was an "off" year for measles in Richmond. Doctor Levy, points out, as he has in previous reports, that measles is a disease over which we have not yet gained control. The measles chart showing the two epidemics of measles which were predicted by the health officer is particularly interesting. Those interested in the prevention of infantile diarrhea will find much of value in that section of the report dealing with this subject. The work of the nurses was unquestionably the means of saving the lives of many babies: "Case after case came to their hands in which a feeble baby had an ignorant mother under whose care the baby would almost certainly have died, but by the instruction and the actual demonstrations given by the nurses many of these babies were saved." Believing that infection plays a most important rôle in the causation of the fatal type of infantile diarrhea, Doctor Levy for the last few years has had the department nurses emphasize above all other things the care of the diaper. "The fecal matter of a community is not completely looked out for merely by complete sewerage of that community. A considerable part of this is the bowel discharges of babies, and, even though a city is 100 per cent. sewered, this portion of it does not go into it directly. Its immediate destination is the

diapers, and, unless these are cared for properly, there will still be a spread of intestinal troubles, especially among infants." Space prohibits dealing in detail with the improvements in the milk supply. The section entitled "Safe Raw Milk" will be of interest to all. With regard to whether or not milk should be thoroughly pasteurized Doctor Levy has the following to say: "Speaking plainly, we feel that there are advantages and disadvantages on both sides. We feel, furthermore, that if Richmond, with a milk supply, the excellence of which is recognized by all who have looked into it, should resort to compulsory pasteurization it would be equivalent to saying that no city can ever so safeguard its milk supply as to make it safe for human consumption without pasteurization. At the present time a considerable proportion of our milk supply is pasteurized, by the choice of the dairymen. Every person has it thus in his power to get either raw milk or pasteurized milk, whichever he may prefer, or whichever his physician may wish him to have. This, we believe is the best solution of this much debated question."

The net cost of maintenance for the Health Department for the year was $48,642.00.

No one can read this report without being thoroughly convinced of the absolute value of modern preventive medicine. This report is written in such a manner that it should be thoroughly intelligible to every interested citizen. Doctor Levy and his staff deserve the congratulations and thanks of the citizens of Richmond. Many health workers will receive an inspiration through the careful perusal of this valuable document.

Winnipeg, Manitoba.

Winnipeg spent 44.7 per capita during 1914 for strict health work. The death-rate for the year was 9.62 per 1,000 inhabitants, the lowest recorded by the department. The typhoid fever rate was 3.9 per 100,000, the lowest record, which is naturally the source of great satisfaction. One hundred six cases of smallpox with no deaths were reported. This was a considerable increase over the previous year. As usual, unvaccinated individuals furnished practically all of the cases; only two patients of the total had ever been successfully vaccinated, one a man of 54, vaccinated in infancy, the other a man of 21 vaccinated in infancy. Two thousand three hundred and sixty cases of measles were reported with 22 deaths. There was also a marked increase in the number of cases of diphtheria reported. The increase is attributed to the prevalance of the germ "carriers" and unrecognized cases. The nurses employed by the anti-tuberculosis society were taken over by the Department and given the standing of inspectors. By this means their efficiency has been much increased. The death-rates from pulmonary tuberculosis was 71.4. An educational campaign with regard to cancer was started and it proposed to follow it up. The infant mortality rate dropped from 159 in 1913 to 125 in 1914. This decreased rate is mainly due to (1) lessened mortality among infants born of mothers from southern and central Europe; (2) fewer deaths from diarrheal diseases of children aged three months or less. The Vital Statistics are admirably given. Dr. A. J. Douglas, medical officer of health, should be commended for his good work.

NOTES.

Saving Babies in the Oranges.—A report on the Baby Saving Work of the Oranges—by Edith Rockwell Hall, Field Secretary of the Committee of the Woman's Club of Orange, New Jersey, is the title of a comprehensive little report just out. The pamphlet illustrates a typical example of an admirable organization with an admirable purpose getting out a report which will fall short of reaching the people for whom it is meant. Good work has been done, and the plea and recommendations for more effort is well worded, but all this is to a great extent lost by a lack of organized and graphical presentation. The tables lack totals in many places; subheadings could be often used with decided advantage; greater brevity is sometimes desirable.

The pamphlet as well as the pat'ent and

devoted work it betrays is commendable but a little more attention to its composition and presentation would gain for it the more intelligent and a wider reading which it deserves.

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County-Wide Vaccination.—The county-wide anti-typhoid vaccination campaigns in North Carolina promise to be surprisingly popular. In one county 800 treatments have been given.

According to a press article issued by the State Board of Health, "It is encouraging that most of the people of this county seem to appreciate this opportunity to protect themselves against typhoid and are availing themselves of the privilege. Only last Saturday in Henderson 150 were vaccinated. Doctor Absher the full-time county health officer believes that almost every person has accepted treatment where the eampaign first started."

❋

Saving Babies in Detroit.—The city of Detroit, Michigan, points with considerable pride to the following 1914 statistics:

Infant mortality rate for four congested districts January to July 1, 1914	201 per 1,000.
Infant mortality rate for same districts July 1, to December 31, 1914	92 per 1,000.

"Four Board of Health Nurses," explains the Bulletin of that Board, "entered these districts on July 1, and have since that time coöperated with mothers in promoting health and preventing sickness among infants."

❋

Interstate Sanitary Districts.—The following important announcement is made in the Public Health Report for May 28, 1915:

"To facilitate the enforcement of the interstate quarantine laws and regulations the Secretary of the Treasury has divided the continental United States into districts to be known as interstate sanitary districts. The districts are as follows:

"*District of the North Atlantic.*"—That portion of the United States lying east of a line beginning at the junction of the seventy-fourth degree of longitude and the Canada line and extending sonthward to the forty-second degree of latitude and running west to the seventy-fifth degree of longitude, along which it extends south to the Atlantic Ocean.

"*District of the Middle Atlantic.*—That portion of the United States lying west of the seventy-fifth degree of longitude and bounded on the north and west by a line beginning at the junction of the forty-second degree of latitude and the seventy-fifth degree of longitude and extending west to the seventy-eighth degree of longitude, thence south to the fortieth degree of latitude, thence to the eightieth degree of longitude, and thence south to the Atlantic Ocean.

"*District of the South Atlantic.*—That portion of the United States between the eightieth and eighty-fifth degrees of longitude and south o the thirty-fifth degree of latitude.

"*District of the Gulf.*—That portion of the United States lying between the eighty-fifth degree and ninety-eighth degree of longitude and south of the thirty-fifth degree of latitude.

"*District of the Ohio.*—That portion of the United States lying between the eightieth and ninetieth degrees of longitude and the thirty-fifth and fortieth degrees of latitude.

"*District of the Great Lakes.*—That portion of the United States lying north of a line beginning at the junction of the seventy-fourth degree of longitude and the Canada line, and extending south to the forty-second degree of latitude, west to the seventy-eighth degree of longitude, south to the fortieth degree of latitude, west to the ninetieth degree of longitude, north to the forty-sixth degree of latitude, west to the ninety-third degree of longitude, and north to the Canada line.

"*District of the Missouri.*—That portion of the United States lying between the ninetieth and ninety-eighth degrees of longitude and the thirty-fifth and forty-third degrees of latitude.

"*District of the Upper Missouri.*—That portion of the United States lying west of the sanitary district of the Great Lakes and north of a line beginning at the junction of the ninetieth degree of longitude and the forty-third degree of latitude, extending west to the eastern border of Wyoming, north to the southern boundary of the state of Montana, west to its western boundry, which it follows to the Canada line.

"*District of the Rocky Mountains.*—The states of Wyoming, Utah, and Colorado, and

that portion of the states of Nebraska and Kansas lying west of the ninety-eighth degree of longitude.

"*District of the Rio Grande.*—The states of Arizona and New Mexico, and those portions of the states of Oklahoma and Texas lying west of the ninety-eighth degree of longitude.

"*The District of the Pacific.*—The states of California and Nevada.

"*District of the North Pacific.*—The states of Washington, Oregon and Idaho."

*

After-Effects of Typhoid.—The following statistics given in a press article issued by the North Carolina Board of Health should be an added incentive toward the prevention of preventable typhoid.

"A study of 1,574 cases of typhoid fever shows that 146 died while under treatment, which is not quite one out of every ten. Of the 1,428 who recovered from the immediate effects of the disease, the death-rate for the first three years was nearly twice the normal death-rate of a similar group of persons who had not had typhoid.

"As the cause of death among the patients who died following recovery from typhoid, tuberculosis heads the list with a rate of 39 per cent., with diseases of the heart following with a rate of 14.8 per cent. In other words, the chances for having tuberculosis are increased about three times in those who have recovered from typhoid, while the chances for heart disease are about doubled. In the United States each year, 8,000 deaths occur among persons who have recovered from an attack of typhoid fever but who, as a result of impaired vitality from the disease, succumb during the first or second year after recovery."

*

Health Inspectors and Patrolmen vs. Recreation.—An article in *The American City* for June makes some pertinent suggestions in regard to the coöperation of health inspectors and patrolmen in the adequate supervision of public parks and playgrounds and all other places where the children and youth of the crowded city congregate for recreational purposes. The prohibition of the liberty of the streets to children suffering from contagious diseases, the preservation of order and tidiness and the closing of certain streets in crowded quarters to accommodate playing children is advocated. Whether the ideas are all practical or attainable or not, the central idea of coöperation certainly merits serious consideration.

*

School Health Clubs.—The work of school health clubs in Johnston County, N. C., is causing comment in the state according to an article in the May *Health Bulletin*. In this county forty-five clubs with about twenty-five members to each club have been organized.

The health officer of Johnston County, speaking of the progress of the work and especially of the work of club officers, said:

"They at once began to change the appearance of the school buildings and grounds, and they spread this enthusiasm over the community until the community began to take on a new idea, and began to put things in good order. The result is that the schools are 100 per cent. better than last year and the homes are improved almost equally as well. Pumps have taken the place of the open bucket wells at the schools and individual drinking cups are used. The privies have been made sanitary and no trash is seen on the floor at any time. Meetings are held every two weeks and large crowds gather to hear the pupils discuss subjects pertaining to their physical welfare.

"One of the most beneficial features of the work is the service of the club officers as 'sanitary scouts.' As such they report to the health officer any condition they find not conducive to health. He prepares his 'scouts' for good service by instructing them in matters of health and sanitation and how to meet those conditions to which the duties of their offices are likely to lead them. He sees that the clubs have health literature to read and use, and gives personal attention to the club's monthly reports."

*

Closed Laboratories!—The following which appears on postal cards sent over the state of Minnesota is self-explanatory. The necessity of such action is greatly to be deplored.

ATTENTION, HEALTH OFFICERS AND PHYSICIANS.

"The Diagnostic Laboratory of the State Board at Minneapolis will be closed May 15 and no work along the following lines will be done until August 1, when funds become available.

"Work discontinued May 15 to August 1, 1915:

(1) Examination of nose and throat cultures for diphtheria bacilli;

(2) Virulence tests of cultures from diphtheria convalescents and well diphtheria "earriers";

(3) Widal tests of blood specimens for diagnosis of typhoid fever;

(4) Examination of excreta for typhoid bacilli in cases of suspected dangerous typhoid "earriers";

(5) Examination of specimens of sputum for tubercle bacilli;

(6) Animal inoculation tests of pus, etc., from suspected cases of non-pulmonary tuberculosis.

"The State Board of Health is compelled to close the laboratories, since the Legislature refused to grant funds needed to carry the work to August 1.

"Typhoid vaccine will be issued, free of charge, to physicians, upon request.

"Reports of cases of notifiable diseases and correspondence relating to investigation and control of preventable diseases will be attended to promptly."

*

A Kitchen Experiment.—The following from the weekly bulletin of New York City for May 29, 1915, tells of a unique and interesting experiment:

"For the past three months a public kitchen has been conducted by the Committee on Public Kitchens at 458 West 27th street for the sale of hot cooked food to be taken home for family use. Although operated under the Department of Social Welfare of the A. I. C. P., the kitchen is a business enterprise with a social purpose. Its aim is to sell at cost, good hot food for consumption in homes where it is impracticable to prepare meals, and to inculcate wholesome food habits. Those responsible for the management have tried to make a model kitchen. How well they have succeeded is indicated by the fact that inspectors of the Health Department's Division of Food Inspection have given a perfect score on the sanitation of the kitchen. Moreover, all the employees have been examined for evidence of typhoid infection by Widal tests and bacteriological examination of stools and urine, happily with negative result. These examinations are in line with suggestion recently made in these columns for the detection of typhoid carriers and comply also with the Sanitary Code relating to the handling of food by healthy individuals.

"The Department welcomes this enterprise as promising valuable support to its work in educating the public in matters of food and nutrition, and trusts that it will meet with the success that it so well merits."

*

Qualifications for Health Officers in New York State.—Under the provision of a regulation adopted by the New York Public Health Council, health officers appointed after November 1, 1916, will be required to have special qualifications for their work in addition to being physicians—

The qualifications adopted are as follows:

Resolved, That local health officers appointed after November 1, 1916, shall have the following qualifications:

I. They shall be graduates of medicine of not less than three years' standing;

II. They shall when appointed be not less than twenty-four nor more than sixty-five years of age;

III. They shall have complied with one of the following requirements:

(a) They shall have taken a correspondence course in public health of one year with at least one week of practical demonstrations in laboratory and field work, both correspondence course and demonstrations to be approved by the Public Health Council, with examinations and a certificate;

or (b) They shall have taken a course in public health of at least six weeks including practical laboratory and field work with lectures and reading at an educational institution, such course to be approved by the Public Health Council, with examinations and a certificate;

or (c) They shall have submitted evidence satisfactory to the Public Health Council of special training or practical experience in public health work, with examination if required by the Council;

Provided, however, that under special conditions specified in writing by the local board of health or other appointing power or by the health officer, any of these qualifications may be waived by the Public Health Council.

*

New York State Milk.—In the "Public Health Hints" prepared each week by the New York State Department of Health, the citizens of that state have recently been reminded that "the Section of the State Sanitary Code governing the quality of milk and cream sold throughout the state went into force Nov. 16, 1914. By this time its provisions should have been put in operation by the health officer of each city, town and village and everyone should be able to purchase properly *graded* and *labelled* milk and cream and to know just *what he is paying for*.

"The caps on bottles and the labels on cans of all milk or cream sold at retail must be marked—either; Certified, Grade A Raw, Grade A Pasteurized, Grade B Raw, Grade B Pasteurized, Grade C Raw or Grade C Pasteurized.

"Certified milk is the highest grade of raw milk. It is certified as of specially good quality by the county medical society and the herds which produce it must be tested once a year with tuberculin, and all cows which react, promptly excluded from the herd.

"Grade A Raw milk and cream must also come from dairies where tuberculous cows are detected and excluded by the use of the tuberculin test. It must have a low bacterial count and the farms producing it must make a 75 per cent. perfect score on the official score card of the State Department of Health.

"Grade A Pasteurized milk and cream comes from herds which are shown to be healthy, as disclosed by an annual physical examination by a veterinarian, but which need not be subjected to the more severe tuberculin test, and the farms need only score 68 per cent. on the Standard score card. It may contain more bacteria before pasteurization than Grade A Raw, but after pasteurization it can contain only half as many as are allowed in Grade A Raw. The process of pasteurization required by the Code destroys all disease bacteria and the State Department of Health strongly recommends the general use of milk which has been rendered safe by this process.

"Grade B Raw milk may contain the same number of bacteria and Grade B cream more than Grade A Pasteurized does before pasteurization, and the dairy score may be only 60 instead of 68 points.

"Grade B Pasteurized milk and cream comes from cows shown to be healthy, by an annual physical examination, and from dairies scoring 55 points on the score card. The bacterial limits are more lenient than for Grade A milk, but efficient pasteurization makes such milk entirely safe while its cost should be less than Grade A. It is the hope of the State Department of Health that this grade may soon make up a large proportion of the milk supply of the State.

"Grade C milk is only safeguarded by the provision that the dairies from which it comes shall score 40 on the standard score card and that it shall be delivered within 48 hours from the time of milking. This grade of milk and cream can not be recommended for drinking and should never be used without pasteurization or cooking, and should never be given to infants."

Public Health Notes.

The History of a Typhoid Carrier.—*The Journal of the American Medical Association*, June 19, 1915, contains an article on the above topic by Dr. W. A. Sawyer setting forth some interesting facts.

The author's summary follows:

"1. Although frequent examinations of the feces of the typhoid carrier H. O. gave negative results for four months after he had been treated with autogenous typhoid vaccine, he infected three persons when subsequently released from quarantine on parole. The total number of persons infected by this carrier is thirty, including five who died.

"2. In a further attempt to cure this carrier, the gallbladder and its duct were removed surgically, but the typhoid bacillus was found in the feces several times after the operation. Examination of the gallbladder showed that it was normal and that its contents were free from typhoid bacilli.

"3. After forty-one successive examinations of feces during a period of fourteen months, all with negative results, the typhoid bacillus was isolated from stomach contents containing bile.

"4. Certain typhoid carriers are unusually dangerous and must be controlled by quarantine or other adequate supervision."

Education, Sanitation and Crime.—The accompanying illustrations which recently appeared in the *Survey*, show the school-house, a tumbledown log structure, and the fine new brick and stone jail in a certain southern community. The pictures tell the quality as well as quantity of education. It is not at all surprising that a community, where education, where the children of the inhabitants are not held to be





deserving of better quarters than the "Schoolhouse" shown in the cut, should need a rather capacious jail for the confinement of the products which the educational system has turned out.

Can't you see a mental picture of the interior of this school-house? In the corner there is a bench on which is a bucket of water brought from a spring in the nearby pasture close to the manure pile, beside the bucket is a rusty tin drinking cup or dipper. A common towel hangs on a nail in the wall (probably over the water bucket) if, indeed, there is a towel. The new jail on the other hand is probably equipped with electric lights and modern plumbing.

*

Sterilization of Water by Chlorine.—The necessity for supplying troops with pure water has produced much discussion concerning methods of sterilizing water by means of chlorine. Capt. J. H. Nelson, I. N. S., describes a method for obtaining the chlorine from potassium chlorate by treating it with concentrated hydrochloric acid. The chemical reaction that follows is represented by the following equation: $4\ KClO_3 + 12\ HCl = 4\ KCl + 6\ H_2O + 9\ Cl + 3\ ClO_2$.

Besides the chlorine there is also liberated a large amount of chlorine peroxide which is a powerful oxidizing agent. It is probable that

some of this is acted upon by the hydrochloric acid with the liberation of chlorine. The apparatus for generating gas which the author describes weighs only twelve pounds and contains enough material to sterilize 9,600 gallons of water. Experiments have shown that the use of one part of chlorine for 500,000 parts of water allowing thirty minutes' contact gives excellent results. This source of chlorine has an advantage over the use of bleaching powder since the latter is unstable and difficult to obtain.—*British Medical Journal*, May 8, 1915.

✻

San Francisco Session of the American Medical Association.—The reports of the proceedings of the Annual Session of the Association, held at San Francisco, which appeared in *The Journal of the American Medical Association* for July 3, are gratifying evidence of the work being done by the organization. The attendance was fully as large as the most optimistic expected. The number who registered from the Pacific Coast States proved the interest of the profession in that territory. The minutes of the House of Delegates show the efforts of the Association in advancing the usefulness of the profession in serving the public. The exhaustive consideration of the relations which physicians must meet in the sociologic conditions which prevail, especially in the development of workmen's compensation legislation, as they are presented in that portion of the report of the Judicial Council devoted to this subject, merits special study. The action of the House in directing that this subject be brought to the attention of the different branches of the organization shows the policy of the Association: that the medical profession shall seek to advance the betterment of conditions under which the people live and labor. This is but one evidence of the earnest thought which is being given to the problems which come before the House of Delegates. The number of important measures which were considered and wisely determined can be appreciated only by a careful reading of the records. The work of the Scientific Assembly—the sections—was good. The programs were excellent and most of the meetings were fairly well attended, and interest was manifested in the papers presented and discussed. The Scientific Exhibit, as always, commanded the interest of the Fellows; not only the excellence of the work displayed but its practical value to the profession and the clear demonstrations made by those who contributed were frequently commended. The Commercial Exhibit was most creditable and fully deserved the interest manifested by those who visited the booths of the exhibitors. The social events were well planned and carried out. Especially were the excursions enjoyed by those who were able to take advantage of them. The success of Commemoration Day has already been noted. The exposition did not detract from the interest in the work of the Association as might have been expected, but was always available whenever leisure time permitted the Fellows or their ladies to visit it. The members of the local profession exerted themselves with true California hospitality to provide for the comfort and pleasure of the visitors and are to be congratulated on their conduct of the convention. The San Francisco Session was a great success.

✻

Suburban Infant Mortality.—No. 4 in the "Infant Mortality Series" of the federal "Children's Bureau," consisting in an excellent report on a study of infant mortality in Montclair, N. J., which place was chosen as a typical suburban community, has made its appearance.

The report, after a short introduction, recounts the general characteristics of Montclair with regard to location, history, population, wealth, industries, liquor licenses, hospitals and social agencies. The analysis then summarizes and correlates the effects of such factors as, environment—neighborhood incidence and housing, nativity, nationality and color of the mother, age at death and direct cause of death, sex, illegitimacy, attendant at birth, economic status of family, occupation and literacy of mothers, and feeding. The year for which the study was made was 1912 and the beneficient effects of certain remedial efforts is strongly emphasized. An infant mortality rate of 130.4 was recorded for 1912 in Ward 4 while that of the entire town was 84.6. Ward 4 is the most congested district of the city and the home of the greater part of the colored and foreign population, the latter being predominatingly Italian. In two years the rate of this ward was reduced to a point well below the average of the entire place. This gratifying decrease "should probably be ascribed largely to the development of the baby clinic, with the 'follow-up' visits of the nurse to the mothers in their homes

and to the careful supervision by the board of health of the housing and sanitation of this section."

The report is well worth careful inspection, partly because it corroborates modern ideas with regard to causes and effects of high infant mortality rates, but chiefly because of the encouragement and indisputable evidence it affords to public health unbelievers.

✻

Humanized Milk in Infant Feeding.—The *British Medical Journal*, May 22, publishes an article by J. Epstein showing that humanized milk or cow's milk with a percentage composition of human milk, is a good food for healthy infants deprived of breast feeding. An examination shows that the upper fifteen ounces of a quart bottle of milk which has been standing for six hours at a temperature of 40 to 50 degrees F. has the following percentage composition: protein, 3.40; sugar, 4.50; fat, 8.00; salts, 0.70; water, 83.40. By diluting with an equal volume of water and adding sugar contents to the desired degree a substance very similar to human milk may be be obtained. This composition is as follows: Protein, 1.70; sugar, 7.00; fat, 4.00; salts, .037 or .035; water and .8695.

✻

School Hygiene and School Architecture.—Dr. J. B. Todd, in the *New York Medical Journal*, June 19, sets forth the advantages of the one-story cottage multiple unit school buildings. He considers the present type of school building unsanitary because of the common corridors and toilet rooms in which all pupils mingle. In addition to this there are increased fire dangers and difficulties of ventilation. The saving in building spaces is slight and more than offset by the disadvantages of the present style of architecture for school buildings.

The plan of one-room cottage schools which originated with Dr. R. W. Corwin of Pueblo, Col., has now been adopted by many cities. This plan eliminates all unnecessary "contacts," fire risks, building costs, and ventilating problems. The large ground necessary is a distinct asset. The plan is elastic, inexpensive and facilitates school administration.

✻

Precautions to Printers.—The following list of precautions under the above title appeared in the New York City Bulletin for May 22.

"Hoods must be placed over linotype metal pots, and have pipes connecting.

"Remember, pig-lead used in linotyping is softer than lead of type. Handle it as little as possible. Drop pig-lead carefully into melting pot. Splashings of molten lead dry later and become lead dust.

"Do not shake crucible in order to blend molten lead better. It will blend itself.

"Plungers on linotype machines should never b cleaned in the work room. Clean them in boxes in the open air. Avoid inhaling the dust.

"Graphite used for lubricating is not poisonous but all dust is irritating to the lungs.

"Avoid lead dust, as much as possible, when trimming and mitreing, or when sawing.

"Remove lead dust from type cases in the open air, or by means of a vacuum cleaner.

"Never put type into the mouth, or moisten fingers to get better hold of type.

"Benzine and lye are skin irritants. Use them with care.

"Insist upon having good ventilation in the office or factory, and insist that floors shou'd not be swept during work'ng hours.

"Suggest to your employer that walls and ceilings of work room, if not of smooth, washable surface, should be lime-washed once a year; that close-fitting floors which can be cleaned by moist methods are desirable; and that type-cases should fit closely on the floor, or have legs high enough to brush under.

"Eat a good breakfast before beginning work. Food in the stomach, especially milk, helps to prevent lead-poisoning.

"Do not eat food, or use tobacco, while at work, unless your hands are first carefully washed, because of the danger of getting lead into the mouth. Do not use a 'common' drinking cup; such a cup may be employed by a tuberculous or otherwise infected person. Wash hands thoroughly with warm water and soap. Have your own towel and soap. Rinse the mouth and clean the finger nails before eating.

"Don't spit on the floor. Use cuspidors and see that they are cleaned daily.

"Eat your lunch outside the work room.

"Do not wear working clothes too long without change.

"Hang street clothes where they will not be exposed to the dust of the work room.

"Gas and electric lights should be shaded, to prevent a glare. The eyes should be examined

from time to time by a competent physician. Avoid ruining your sight by giving early attention to eye-strain. Headaches, blurred vision, red and inflamed eyes, dancing spots before eyes, twitching of the eyelids, are some of the first signs of eye-strain.

"Insufficient light may impair the general health.

"Bathe frequently, and brush the teeth each night.

"Avoid alcohol. It increases the danger of lead poisoning.

"Have a good bowel movement each day.

"Exercise in the fresh air as much as possible.

"Be examined by a doctor occasionally to protect yourself against the effects of your trade."

Issued by Division of Industrial Hygiene,
Department of Health,
City of New York.

*

Sanitation in Vacation Haunts.—Because thousands of people are choosing the place for their summer vacation by no other criteria than theoretical comfort and beauty of surroundings, it is well to bring to general notice the address on "Rural Sanitation, Its Interest and Value to Residents of Cities," read by Hyde R. Fussell, Sanitarian of the West Disinfecting Company, at the Safety and Sanitation Exposition in New York City.

The summer visitor to the country should assure himself that attractions such as a good room in a pleasantly situated house do not lead him to overlook insanitary conditions dangerous to his health. "We usually seek an hotel or boarding house," says Mr. Fussell, "that is good or fairly good, and we are satisfied to rough it in many respects for the time being. In fact the period of the year that should have been one of rest for us, a vacation, often ends in sickness, grief and a funeral, and this all through negligence regarding the care with which the locality of our summer vacation was selected.

"Undoubtedly, you make careful inquiries as to the beds and cleanliness of the place generally, and are particularly interested as to the table. In rare instances, you may inquire into the water conditions. You are usually informed that they have good drinking water and that the well is protected by a bed of sand or earth, and consequently, nothing can get into it. Frequently, the outhouses are located above the water source and possibly as near as one hundred feet. We all know that sand and soil do not prevent specific disease germs from entering water as after a time, the sand or soil becomes loaded with known disease-bearing bacteria which will get into the drinking water as there is no way for the soil or sand to cleanse itself or get rid of disease-bearing organisms.

"To visit an insanitary toilet, whether it be day or night, and all outside toilets are insanitary, is a duty always neglected, consequently, people subjected to this outside inconvenience practically put off nature's call. Then intestinal absorption takes place and our enemy, auto-intoxication, is with us. This is one of the poignant reasons why rural residents, in spite of their oxygen ad lib. are not as healthy as their city brethren who obey nature's call when made, simply because they have inside conveniences.

"Modern invention has given us inside sanitary closets which are absolutely safe in every way and installed without any difficulty in any country home no matter how humble."

Mr. Fussell also emphasizes the dangers from raw vegetables which have been fertilized with the contents of privies and cess-pools.

"Suppose, in your auto, you leave your home and its modern protection and journey with your friends to some noted roadside resort famous for it dinners. You get your dinner. It is a good one and you enjoy it. Yet it occurs to me that this enjoyment would be somewhat curtailed if you were familiar with the sanitary surroundings of that hotel, for in many instances the water you drink or even wash your hands with, is drawn from a well located a few feet from an outhouse, and from this outhouse to the kitchen where your food is prepared flies constantly perambulate.

"Traveling by boat, we are far from safe. The water with which we perform our ablutions and wash our teeth, is usually drawn from the river, and into this river the waste material of thousands of human beings, with its manifold disease-bearing propensities, is constantly emptied."

Industrial Hygiene and Sanitation.

Mine Safety Meeting.—The Third Annual Joint Field Meet of the United States Bureau of Mines, the American Mine Safety Association and the California Metal Producers Association will be held at the Panama-Pacific Exposition September 23 and 24. The meeting will be held near the time of certain other important gatherings of mining men which are scheduled to take place in San Francisco in September and a large attendance is expected at the following features of this notable exhibition:

On September 23, on the athletic field of the Panama-Pacific International Exposition, there will be a mine-rescue demonstration at 10 o'clock; at 2 o'clock in the afternoon there will be a first-aid demonstration; and at 4 o'clock a demonstration of the explosibility of coal dust.

On September 24, at 10 o'clock, will be held a first-aid contest for inter-state supremacy; at 2 in the afternoon a rescue contest for inter-state supremacy; at 4 in the afternoon a rock drilling contest; and at 8 o'clock in the evening, there will be an award of prizes and souvenirs at the Convention Hall.

A number of well-known mining men and others have been assigned to the various committees to have charge of the joint field meet:

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For Rural Sanitation.—Public Health Bulletin No. 68, by Lumsden, Stiles and Freeman, entitled "Safe Disposal of Human Excreta at Unsewered Homes," is a most excellent pamphlet to place in the hands of farmers and the inhabitants of unsewered villages. It is well illustrated, practical and of a style that will appeal to the most elementary sanitary instinct.

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A New Bulletin.—The *Health Bulletin* of Harrisburg, Pa., made its initial bow to public health circles in April. Four of the eight pages are devoted to milk and cream analyses. The remarks and suggestions are pertinent and the request for an exchange of bulletins should meet with a hearty response.

A Good Type of Safety Sign.—

NOTICE.

When you see a place or machine not properly guarded, notify the safety committee. They want to know about it.

"This is one of the many educational and warning signs conspicuously posted throughout the New Jersey Zinc Company's plant at Palmerton, Pa. The New Jersey Zinc Company is well known for the practical character of its safety organization and the enthusiasm of its safety committees.

"This Company has a permanent exhibit of its devices and methods for promoting safety and health at the Museum's headquarters. It has twice been awarded Grand Prize for the excellence of its accident prevention methods at the Expositions of Safety and Sanitation held annually in New York, under the Museum's auspices."—Supplement to *Safety*, April, 1915.

*

"Alcohol vs. Safety."—The effect of alcohol upon the industrial worker is better realized today than ever before. W. A. Rice in *Safety Engineering* for May effectively tells where the alcoholic stands with the business man and the insurance companies.

"The man who drinks, even moderately, is no longer wanted in any line of work. He is not a good risk for life insurance. He is not wanted in little or big business. The railroads and the factories will not employ the drinking man if they know him. The man found drinking is discharged promptly. For successful work, the best results can be wrought by men who are abstainers, with level heads and sound bodies. The total abstainer is the man preferred in all the walks of life.

"The remarkable growth in public sentiment in favor of total abstinence means the conservation of human life, a lengthening of the average longevity, and consequently a gradual reduction in the death-rate from alcoholism. The most eminent medical authorities condemn the use

of liquors in any quantity as injurious to human life.

"From a business standpoint the life insurance companies and the fraternals are vitally interested in the fight to overthrow King Alcohol; for alcoholism is directly and indirectly the cause of a very large percentage of death cases which drain the mortuary funds of vast sums annually."

*

Anti-Typhoid Inoculation in the Industrial World.—Dr. L. S. Mackid relates the experience of the Canadian Pacific Railway Company with anti-typhoid inoculation. It has been the experience of the company that each typhoid patient loses about 120 days. In 1911 there were 320 cases of typhoid fever on the Alberta division, meaning a loss of time to the company of 38,400 days. Two years ago the company made arrangements to furnish free inoculation to every employee who desired it. As to the time lost as a result of vaccination, about 95 per cent. of the men kept right on with their work. The other 5 per cent. were laid off for not longer than forty-eight hours. It required much persuasion to induce many of the employees to submit to inoculation. The author believes that the term inoculation should always be used instead of vaccination as laborers are likely to expect results similar to those produced by smallpox vaccination.

The following table shows the results of vaccination during the last two years:

Total number of men employed on the division	24,000
Total number vaccinated: First year 5,500, second year 8,400	13,900
Non-vaccinated	10,100
Number of typhoid cases among non-vaccinated, First year 220, second year 70	290
Number of typhoid cases among vaccinated: First year, 2, second year 1	3

Medical Officer, June 12.

*

Small Injuries and Big Results.—The following interesting note is from the "Man on the Job" section of *Safety Engineering* for June:

REPORT SLIGHT INJURIES AND AVOID BLOOD POISON.

One of the biggest problems of the employer is the prevention of blood poison from the neglect of small injuries. The workmen, generally, do not report slight injuries, and, as a result, in a great number of cases severe infection sets in. We have been very successful in combating this condition by impressing on each individual workman the rule, "If you are injured, no matter how little, tell your foreman about it right away and go to the doctor. A slight injury may cause blood poison." We found that even after this rule had been impressed upon the workmen, some failed to report slight injuries and blood poison resulted.

*

Constipation.—The Ford Motor Company through its publication "For You," gives its employees the following excellent advice regarding the danger of constipation:

"One of the greatest causes of constipation is irregularity in the habit of going to the stool. On the other hand, many of these cases can be permanently cured by the practice of regularity in this matter. Attempt a movement of the bowels at a definite time each day.

"To use cathartics and pills as a regular habit, is useless as a cure, and will only make your condition worse. It is much better to correct constipation by the use of proper food than by medicine.

"Persons subject to constipation should eat plenty of green vegetables, graham bread and such other articles of food. They have a mild laxative action. Drink plenty of water, but *not when you are working in a very hot room.*

"Exercise of the abdominal muscles by contracting and relaxing the abdomen also helps in a mechanical way.

"Nearly all the serious diseases are due in some way to constipation. Appendicitis, liver trouble, stomach trouble and many others come from constipation."

"*Be regular in your habits and eat the right sort of food.*"

*

Judicial Protection For the Safety of Workplaces.—A recent decision of the Appellate

Division of the New York Supreme Court will have considerable influence in shielding a certain class of municipal safety ordinances from attack by employers who are seeking to avoid the installation of proper safety devices. The point of this case, *People* v *Kaye*, 160 App. Div. 644, was as follows: The Labor Law of New York makes mandatory the installation of automatic sprinklers in factory buildings of a certain character. In New York City these installations are to be approved by the Fire Commissioner. A city ordinance, prior to the state statute, authorized the Fire Commissioner to require such installation generally as he might direct. A certain owner refused to comply with an order made by the Fire Commissioner under the ordinance mentioned. His defense was that the state law had repealed the more specific city ordinance, therefore, since his building did not come within the class to which the state law applied, he could not be compelled to make the installation. The Appellate Division refused to entertain this argument and sustained the conviction. While this case involves more directly the question of safety than of health, it is nevertheless a matter of some gratification to those interested in the reduction of industrial hazard and displays the willingness of the courts generally to sustain action by city legislative bodies, which is reasonable and not clearly beyond the scope of their authority, adapted to the protection of the worker.

❋

Care of Excreta at Labor Camps.—The following provision, found in the chapter of the New York State Sanitary Code dealing with Labor Camps, should, if adequately enforced, go a great way in reducing the amount of stream polution in the neighborhood of the many camps which are constructed and used during the summer season:

1. The nearest part of a tent, building or car used for a labor camp must be not less than 50 feet from the water's edge of any lake or stream used for public water supply.

2. Every camp must have suitable privies.

3. If a camp privy is more than 200 feet from the water's edge it may consist of a pit not less than 2 feet deep. This pit, however, must never be filled within more than one foot of the top and the excreta must always be covered with dirt. Such a pit and shelter over it must be covered with fly netting, where it is to be used for more than 6 days in the period between May 1 and November 1.

4. Privies may not be located nearer to a source of water supply than 50 feet in any case and when they are located nearer than 200 feet they must fill the following requirements: There shall be no pit but the excreta shall be received in a water-tight tub or bucket which shall be periodically removed and emptied. Such privy must be screened and kept clean. The buckets must not be allowed to get so full that they will spill in removing. The contents of buckets used in this type of privy must be carried at least 200 feet from the water's edge and there either burned, or buried in a trench at least 2 feet deep and covered with a foot of earth. The buckets are to be rinsed with a disinfectant which shall also be poured into the trench.

❋

Eye-Shades.—Vol. I. No. 11, of "For You," the health and safety bulletin which the Ford Motor Company publishes for distribution to its employees, contains the following interesting note in regard to eye-shades:

Use Care About Eye-Shades.

It is dangerous to wear eye-shades made of celluloid when you are working near fires, furnaces, or any place where there is a flame. They may catch fire, and do serious injury to your eyes.

Men who were wearing celluloid collars have been badly burned because the collar caught fire and could not be torn off before the damage was done.

Celluloid is a material which burns very rapidly. If you had such an eye-shade and it caught fire, you might lose the sight of both eyes. It doesn't pay to take a chance.

Some goggles also have parts made of celluloid. These are almost as dangerous as the eye-shades, when working near a flame. Be careful to see that your goggles are protected by metal or by wire screen.

Be careful. You will be almost sure to have your eyes burned if you wear such shades near a furnace.

Unemployment in Massachusetts.—The question of unemployment always affects the matter of public health more or less directly since its result is to deprive the workers and their families of some of the nourishment or other means essential to the maintenance of the best health standards. The report of the Bureau of Statistics of Massachusetts for the quarter ending March 31, 1915 shows 16.6 per cent. of the members of the local labor unions of the state as unemployed. This is almost 2 per cent. less than for December 31, but is the highest for this quarter since 1908. For boot and shoe workers, representing probably the largest class, the percentage was 22.4.

*

A Bibliography of Labor Reports.—The Industrial Commission of the New York State Department of Labor has recently issued a bulletin, whole No. 71, comprising an annotated list of all the government labor reports received by that department from October, 1913 to May, 1915 together with a list of the government labor periodicals received by the New York State Department.

The introductory note calls attention to the fact that while this list is not exhaustive it is fairly comprehensive inasmuch as the department receives the publications of nearly all the similar departments in the world.

The list classifies the publication under the following divisions: (1) United States (Federal) reports, (2) State reports, (3) Foreign reports, (4) Periodicals.

There is a short note describing the field covered by each report.

This bulletin will be of immense value for reference purposes to those interested in labor statistics and labor legislation whether from the standpoint of the hygienist or sanitarian or otherwise.

*

First Aid Kits.—The New York Industrial Code, promulgated by the Industrial Board of the State Department of Labor, requires that a first aid kit shall be on hand at all times for the use of employees without expense to them in every factory employing more than ten persons in which power-driven machinery is used for manufacturing. The same rule requires that there shall be a suitable place for administering this first aid, and the other necessary facilities such as soap and water must be at hand.

A subsequent rule prescribes the contents of such kits as follows:

Instruments.

1 pair scissors. Tourniquet.
Thumb forceps. Graduated medicine glass.

Drugs.

2 oz. aromatic spirits of ammonia.
2 oz. 4% boric acid.
2 oz. alcoholic iodine solution, half strength (for external use).
2 3 oz. collapsible tubes of bicarbonate of soda mixed with vaseline [3%] (for burns).
2 oz. castor oil (for eye injuries).

Dressing.

1 doz. assorted sizes sterile gauze bandages.
1 spool Z. O. adhesive plaster, 1 inch by 5 yards.
3½ oz. packages of absorbent cotton.
3 1-yard packages of sterile gauze.
Splints of assorted sizes for fractures.
Wooden applicators wound with cotton.
Wooden tongue depressors.

This rule is all very well as far as it goes, but it is worth while noting that an occasional accident may happen in the small shop where less than ten men are employed. In such a case it is quite as important a thing to the man who happens to be injured to have the benefit of a first aid kit as it is to the man in the larger shop. The small shop is also more likely to be some distance from the nearest surgeon or physician than the large factory where many men are employed. The cost of the kit is so little that it could hardly be a burden to employers of only a few hands. The question of "where to draw the line" is indeed a perplexing one.

*

Industrial Accidents in Ohio.—That more care must be taken to prevent infection of wounds is strikingly demonstrated by a recent report issued by the Industrial Commission on accidents in Ohio. Of 25,731 industrial accidents causing loss of time but no permanent injury, one out of every 14 was infected in greater or less degree. Of 601 accidents which resulted in permanent partial disability, one out of every 29 was complicated by infection.

According to this report, the danger of infection is much greater in cases of lacerations, punctures, abrasions, bruises, etc., than in cases of burns and scalds. Of 15,389 cases of laceration, etc., one case in 10 became infected. One out of every 20 of the 2,208 burns, scalds, etc., covered by the report was rendered more serious by infection. Although getting a foreign body in the eye is not popularly regarded as dangerous, in one out of every 24 such cases, infection followed.

The 128 fatal accidents analyzed in the report were ascribed to a variety of causes. Thus 15 men were killed in coal mines, by falls of stone, slate, or coal. Another 15 were killed by falls from considerable heights. Nine of these fell from scaffolds, staging, etc., three fell into elevator shafts, and three fell while cleaning windows. The deaths of 33 men were ascribed to causes connected with the operation of various kinds of machinery, while hot metals, dynamite and other materials handled, cost 17 lives.

Stamping, shearing and punching machines won an unenviable first place among the different types of machinery causing permanent partial disability. Out of a total of 601 such accidents, 94 were ascribed to the action of machines of this type.

A large part of the report is devoted to causes of accidents, but it also contains a great deal of information concerning awards, duration of disability, hour of accident, day of accident, nature of injury, etc.

Anyone may secure a copy by addressing the Industrial Commission, Columbus, Ohio. The report is designated as Report No. 4 of the Department of Investigation and Statistics, and six cents should be inclosed to cover postage.

Personal Notes.

The following were elected to membership in the American Public Health Association on July 15, 1915:

Charles G. Plummer, B. L., B. S., M. D, Salt Lake City, Utah.

Isaac W. Brewer, M. D., Geneva, New York.

Payn B. Parsons, Bacteriologist, New York City, N. Y.

John S. Hitchcock, Health Officer, Northampton, Mass.

Ernest H. Cox, M. D., Cleveland, Ohio.

Industrial Commission of Wisconsin, Madison, Wisconsin.

Edwin C. Shaw, Akron, Ohio.

Randle C. Rosenberger, M. D., Philadelphia, Pa.

Prof. Willis J. Bray, Kirksville, Mo.

John A. Warkins, M. D., Pittsburgh, Pa.

Merrill E. Champion, Health Officer, Wollaston, Mass.

Frederick W. Berger, Bacteriologist, Baltimore, Md.

Harry B. Siegmund, Baltimore, Md.

Charles H. Jones, M. D., Baltimore, Md.

Lester W. Feezer, Cambridge, Mass.

Nicholas C. Hamner, Chemist, Dallas, Texas.

Wm. M. Wallace, Chemist, Detroit, Mich.

Louis I. Harris, M. D., New York City, N. Y.

Fred Adams, M. D., Toronto, Ontario.

Willis J. Spaulding, Springfield, Ill.

Lewis Fish, M. D., Fitchburg, Mass.

Algernon S. Barnes, Jr., M. D., St. Louis, Mo

Miss Mary B. Dickinson, Framingham, Mass

Walter H. Brown, M. D., Cambridge, Mass

CORPORATE MEMBERS.

American Telephone and Telegraph Co., New York City, N. Y.

Crane Company, Chicago, Ill.

✻

Surgeon-General Rupert Blue, of the United States Public Health Service, was elected president of the American Medical Association at the recent San Francisco meeting.

✻

Mr. John Hall, for two years health officer of Long Branch, N. J., has been appointed health officer of East Orange, N. J.

✻

Mr. Charles F. Horan has been appointed health officer of Watertown, Mass.

CURRENT PUBLIC HEALTH LITERATURE.

AMERICAN.

Boston Medical and Surgical Journal, Boston.

CLXXIII, No. 2. July 8, 1915.

Leprosy and Its Relations to Massachusetts. J. A. Honey.

The Relation of Leprosy to the Community. G. M. Katsainos.

Bulletin of the Johns Hopkins Hospital, Baltimore.

XXVI, No. 293. July, 1915.

An Attempt to Immunize Calves Against Tuberculosis by Feeding the Milk of Vaccinated Cows. W. L. Moss.

Complement Fixation in Thyroid Diseases. S. R. Miller, R. E. Fairbank.

Common Organisms in Heated Milk: Their Relation to Its Reactions. L. P. Shippen.

Engineering News, New York.

LXXIII, No. 25. June 24, 1915.

Rienseh-Wurl Sewage Screens. Brooklyn.

LXXIV, No. 1. July 1, 1915.

Constructing the Fitchburg Sewage-Works. I. A. Marston.

LXXIV, No. 2. July 8, 1915.

Three Residential Sewage Treatment Plants near Cleveland. R. F. Macdowell.

Engineering Record, New York.

LXXI, No. 26. June 26, 1915.

Improvement Urged in San Diegos Water Department. C. D. Conklin.

LXXII, No. 1. July 3, 1915.

Operating Records of Atlanta Sewage Treatment Plant Show Adequate Degree of Purification. C. C. Hommon.

Iowa Experiments with Oil in Dirt Roads.

New Methods of Odor Elimination at Garbage Plants Indicated by New York Tests.

Journal of Experimental Medicine, New York.

XXII, No. 1. July 1, 1915.

The Occurrence of Carriers of Disease-Producing Types of Pneumococcus. R. G. Wooley, A. DeMar, D. Clark.

Journal of the American Medical Association, Chicago.

LXX, No. 1. July 3, 1915.

The Bacteriology of the Urine in Non-Suppurative Nephritis. G. F. Dick, G. R. Dick.

United States Public Health Reports, Washington.

XXX, No. 25. June 18, 1915.

The Municipal Care and Supervision of the Tuberculous.

XXX, No. 26. June 25, 1915.

Public Health Administration in Toledo. C. Fox.

XXX, No. 27. July 2, 1915.

The Model State Law for Morbidity Reports.

The Zooparasitic Intestinal Infections. C. W. Stiles.

FOREIGN.

Annales De L'Institut Pasteur, Paris.

XXIX, No. 5. May, 1915.

The Virulence of Bacillus Tuberculosis. E. Burnet.

British Medical Journal, London.

2844. July 3, 1915.

The Identification of the Pathogenic Members of the Typhoid-Colon Group of Bacilli. J. H. Smith.

Journal of State Medicine, London

XXIII, No. 6. June, 1915.

The Improvement of the Milk Supply. R. B. Greig.

The Inspection of Foreign Foodstuffs at British Ports. G. Leighton.

The Advantages and Disadvantages of Preservatives in Food. W. G. Aitchison.

Lancet, London.

CLXXXVIII, No. 4791. June 26, 1915.

The Use of Magnesium Sulphate in the Treatment of Tetanus. S. J. Meltzer.

Vaccines in the Treatment of Respiratory Diseases. R. J. Rowlette.

Medical Officer, London.

XIII, No. 23. June 5, 1915.

Maternity and Child Welfare Work at Bradford.

Public Health, London.

XXVIII, No. 9. June, 1913.

The Personal Factor as it affects the Vital Statistics of a Community. W. Robertson.

Are Definite Standards Possible in the Production and Sale of Milk? T. Orr.

Revue D'Hygiene, Paris.

XXXVII, No. 5. May 20, 1915.

The War and Potable Waters. E. A. Martel.

The So-Called Diarrhea of Trenches. P. Remlinger, J. Dumas.

American Journal of Public Health
Official Monthly Publication of the American Public Health Association
Vol. V SEPTEMBER, 1915 No. 9

"THE DEGENERATION OF LIFE."

Proof from Life Tables.

William J. V. Deacon,
State Registrar of Vital Statistics, Kansas.

ARE we saving at the spigot and losing at the bunghole? The children born today have more chance to grow to middle age than they had a half century ago, but having reached middle age they have a smaller chance to reach the allotted "three score and ten" than they had then.

We are told that from the minute we begin to live, from that minute we begin to die; the elapsing interval may be termed "Life," the duration of which in the individual is and will always remain problematical. This seems hardly true in some respects from the curve of the "Expectation of Life," as the curve ascends rapidly after the first year for a short period before beginning its downward course; this is due to the high specific death-rate under one year; as we progress in the educational work for infants this portion of the curve will be gradually flattened.

To lengthen this interval between birth and death has been the aim of the medical profession since the days of Esculapius, but within a generation, in fact since the days of Pasteur, has arisen a new school which is destined to crowd the healers for place—the school, wrongfully termed "Preventive Medicine," wrongfully termed because "prevention" requires no medicine; its use for the individual has passed when medicine is required, except in controlling the relation of the individual to society.

We stated that the duration of life in the individual will always be problematical, but science can forecast with amazing accuracy the probable duration of the lives of a given group of persons—the larger and more select the group, the more accurate the forecast. A forecast for a million people will be more accurate than one for a thousand selected from the same source. So, also, one made for a selected class will be more accurate than one made for the people as a whole; therefore, selections for sex, color, nativity, and parent nativity, all gain in accuracy as additional refinements are made.

There have been constructed several forms of life tables, and they represent four important elements, viz.:

The Probability of Living One Year;
The Expectation of Life;
The Most Probable Lifetime;
The Vie Probable.

The Probability of Living One Year may be described as the relation of the number of persons of any given group alive at the end of the year to the number alive at the beginning of the year.

The most Probable Lifetime is the difference between the age of a person and the age at which the greatest number of persons die.

The Vie Probable is the age to which a person has an even chance of living.

The Expectation of Life, the element to which we will give the most careful consideration in this paper, may be best defined as the number of years which an average number of persons of a given age will probably live. Manifestly, it has no possible relation to the time when any individual will die, nor yet to the time when death may be considered most probable. There is probably no term of like character which is so generally misunderstood by the public, and the writer is of the opinion that no small part of this misunderstanding is due to the practice of irresponsible insurance agents who, through ignorance probably, attempt to convince people that this is the basis upon which life insurance rates are based.

Quoting from Moir:

"The term 'Expectation of Life' is one which is much used and is frequently *supposed* by the uninstructed to be the basis of actuarial calculation. The function has often been *erroneously used* for calculations involving monetary payments and the misunderstanding is one which it is exceedingly difficult to correct. Writer after writer on such subjects has called attention to the true situation, and yet the error survives of supposing that a calculation for a fixed period equal to the Expectation of Life will give an accurate result, the same as a calculation made correctly by using the probabilities of living each year during life.

"By taking the Expectation of Life and calculating an annuity for this period as a fixed term, the result is always greater than the true value of a life annuity. If a similar method be applied to the calculation of life insurance premiums, the result is always too small."

As a basis of comparison, however, between communities, it is most valuable. Age discrepancies, characteristic of the different communities, being equalized with much greater refinement than is possible by any of the ordinary processes of correction or standardization.

It is of equal value for historical comparison, and for that reason it is my purpose to use it to show some of the gains and some of the losses that are apparent as the result of and in spite of our sanitary and hygienic efforts.

For the purpose of showing the degeneration of life, or what might be more accurately described as the "Expectancy Loss" in the later age groups, there have been selected five states which present a somewhat wide range of characteristics, both geograph-

ically and in type of inhabitants. These states are Massachusetts, Ohio, Michigan, Indiana, and California.

For each of these states life tables were computed for the years 1860, 1880, 1900 and 1910 except in California where the table for 1860 was omitted for obvious reasons. In the preparation of these life tables the information was obtained from the Census tables and the number of deaths given in the various age groups were plotted, and the number at each age thus ascertained; where possible, the figures for the years next preceding and following the census, as well as for the census year, were taken and the average ascertained. The population for the census year was taken thereby avoiding the possible errors of "estimated" populations.

The "radix" of 100,000 was used at the beginning of life and the specific death-rate for under one year applied, and the rate for each year was applied to the number remaining until the specific death-rate reached the 1,000 per 1,000 the formula used being that described by Moir as

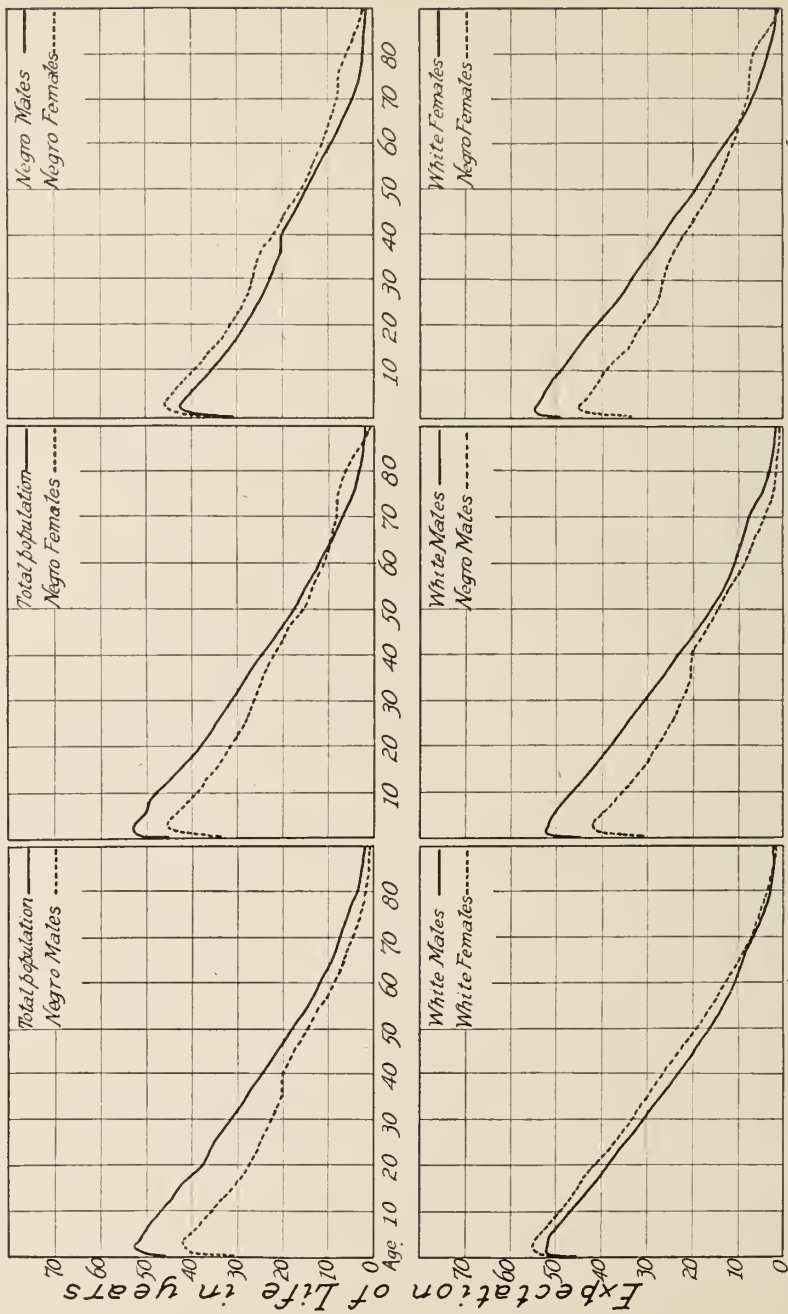
$$e_x = \frac{\frac{1}{2}l_x + l_{x+1} + l_{x+2} + l_{x+3} + \cdots}{l_x} = \frac{1}{2} + e_x.$$

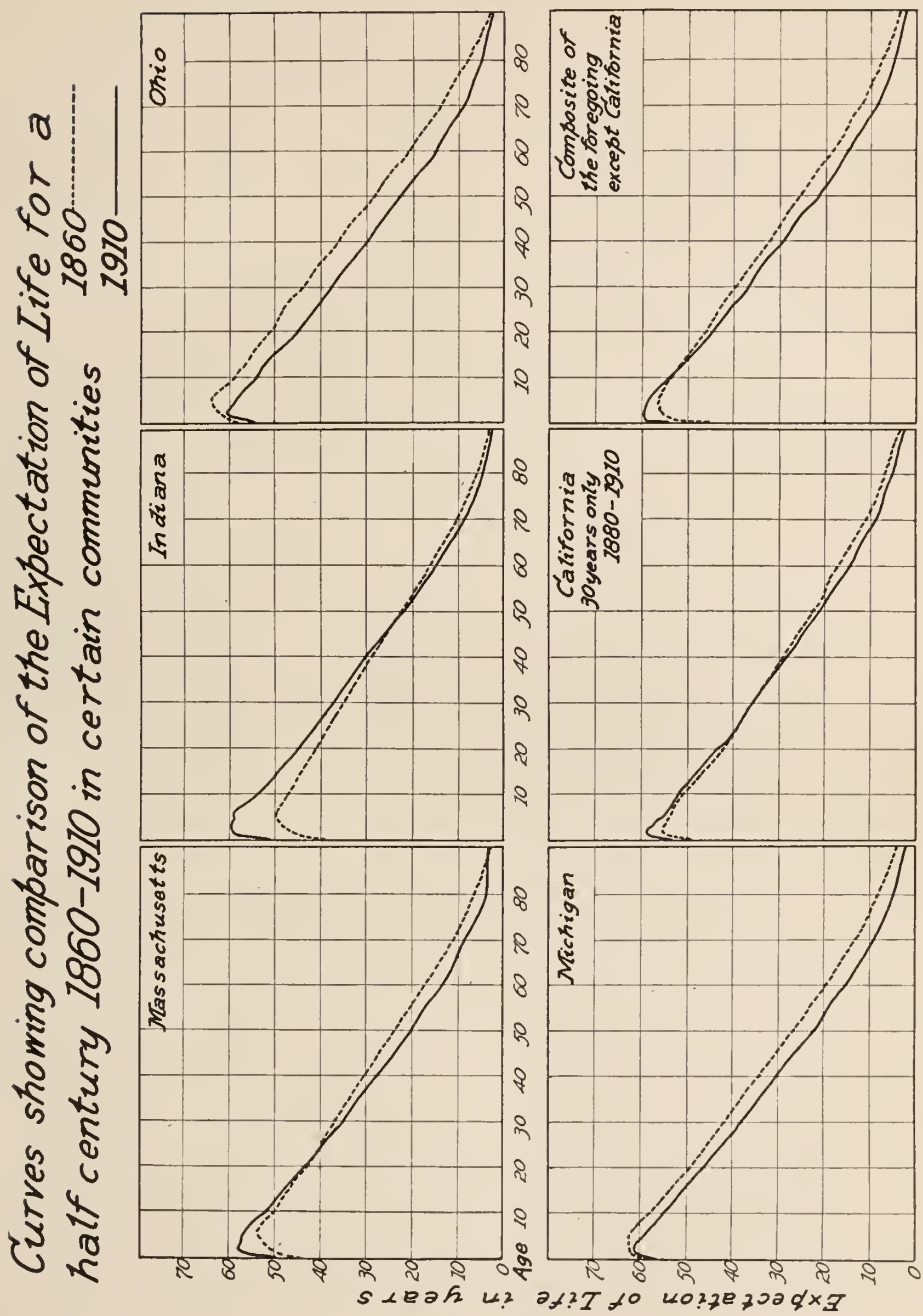
Let us first consider Massachusetts, an old, well-established commonwealth in which much has been done for the public health but where the work has been greatly hampered by "tradition." Here we find a gradual increase in the expectation of life for each age in the comparison between 1860 and 1880 from under one year until the twenty-first year, when the expectation of 1860 is 42.15 years and in 1880 is 42.11 years, and for all ages above twenty-one there is a gradual widening of difference until the sixty-sixth year when the difference is 1.37 years, after which it gradually narrows again. Between 1880 and 1900 there is another marked increase in the early ages, but at twenty years the curves cross and from then on the expectation is less in 1900 than in 1880. Between 1900 and 1910 the increase in the early ages, while not so marked, is persistent until the fiftieth year, after which the expectation is slightly less in 1910 than in 1900. Taking the half century for comparison, we find a marked increase in the early years, which increase is gradually lessening until the twenty-third year, after which the expectation in 1910 is much below that of 1860.

To illustrate the differences more clearly, the summation of the years of expectation up to the twenty-second year, inclusive for 1860, is 1,104.29 years and for 1910 is 1,161.37 years; this shows a gain for 1910 of about 5 per cent. On the other hand, the summation of the years from the twenty-third year on show for 1860, 1,398.42 years and for 1910, 1,247.11 years, or a decrease for 1910 of about $10\frac{1}{2}$ per cent.

In Indiana we find a similar condition existing, but in the comparison of the half century we find the increase of 1910 over 1860 continues to the forty-seventh year with a more marked gain in the early years, as will be noted from the illustrations herewith.

In Ohio we find a somewhat different condition, in the fact that in 1860 the expectation in the earlier years was


Comparison of the "Expectation of Life" by sex and color, Topeka experience.
Expectation of Life in years
Age
Total population
Negro Males
Negro Females
White Males
White Females


Curves showing comparison of the Expectation of Life for a half century 1860–1910 in certain communities 1860 1910
Massachusetts
Indiana
Ohio
Michigan
California 30 years only 1880–1910
Composite of the foregoing except California
Expectation of Life in years
Age
0
10
20
30
40
50
60
70
80

greater than any of the other years presented, although the comparison of 1880 with 1910 shows an increase for 1910. This condition being so unusual naturally leads to a doubt of the accuracy of the 1860 reports.

In Michigan there is much less difference between 1860 and 1910 than in the other states, but still a difference is apparent.

In California the same loss in later life is to be observed.

In all cases it is interesting to note that there is much less difference between 1900 and 1910 than would be expected by comparison of the twenty-year periods previous thereto. Does this mean that we are holding our own better the last decade?

The illustrations on pages 814–815 speak far more plainly than it is possible for pen to describe the fact that we are losing ground with those ills which afflict mankind after passing middle age. Much has been said and written of late years to the effect that, while our public health work was saving many young lives, it was of questionable advantage to the race because it was causing the "survival of the unfit." Such an expression intended to reduce or hamper the work now being done cannot be given serious consideration by any one having the real welfare of the people at heart, but it seems to merit earnest thought of its effect upon the curve of our life tables.

To those of our children of low vitality and weak resistance, the group of diseases commonly referred to as the "acute infectious diseases" are frequently fatal; it takes a strong and vigorous body to resist the attacks of whooping-cough, measles, scarlet fever, and diphtheria, and a generation ago, before the days of antitoxins and serotherapy, the weak were generally eliminated. Those who escaped the infection were usually of the robust type, who were able to resist the degenerative action of the diseases of later life.

It must be remembered, however, that those who suffer from these diseases and recover frequently have a weakened condition of the heart, kidneys, or liver, which may not betray itself until some minor illness of later life causes an "explosion" and they rapidly succumb. This feature was clearly brought out last year before this Association in the very excellent paper by Dr. Louis I. Dublin.

It is certainly of tremendous interest to note the increased "Expectation of Life" in the early ages; certainly we must congratulate those responsible for this splendid achievement. The causes for this result may be briefly stated as follows:

(a) Adequate Laws;
(b) Efficient Administration;
(c) Education;
(d) Vital Statistics.

In these days, when Congress and most of the state legislatures are busy with legislation to protect the people from various kinds of exploiters, it seems, indeed, strange that we experience such difficulty in securing proper laws to protect the people from themselves; but in spite of the difficulty some very wise and far reaching legislation has been the product of recent years, and the health officer of today can perform his duties with much

greater assurance of the support of law and of public sentiment. No law will enforce itself, and to the efficient enforcement of the law due credit must be given and it is encouraging to note that efficiency is now rather the rule than the exception.

By no means the least of the elements that has brought the reduced death-rate and the increased expectancy is the education of the people themselves; carried on as it has been the past few years by many agencies, it is proving well worth while.

That many of the states now have adequate vital statistics and trained health officers are by them able to find the sources of trouble and to eradicate them, may be considered as one of the most important of the elements to be credited with the results. In some of the states the vital statistics department is not connected with the health department. This seems a mistake, as the subsequent use of vital records for legal purposes is by no means impaired by their immediate use for sanitary purposes.

But while we congratulate the race upon this increase for the children, we must bend our energies to such work, hygienic and educational, as will tend to bring the curve to more satisfactory form.

One of the students at the University of Kansas last year in response to the question, "What is the purpose of public health work?" replied, with that brevity called in the Kansas language "pat," "To take the bumps out of the curve."

The tables on pages 818–819 show the comparison of the expectation for the first five years and for each five years thereafter, in the states referred to previously.

Are we disposed to be selective in our public health work? It would seem so at times, when we consider the exceedingly high death-rates among the negroes, particularly from tuberculosis. Where the population of any community includes any considerable number of this race we should not fail to consider this in making any study of death-rates. The accompanying illustrations of the comparisons of the expectation between the white and negro population of the city of Topeka are both illuminating and instructive. The wide difference in the expectation between the white and negro and between the sexes is vividly portrayed and those who have made any study of the social condition of the negro and the apparent indifference or ignorance of the simplest rules of hygiene must be impressed with the necessity of more aggressive work among these people. Regardless of any other reason, this work is necessary for self protection, for as Schneider very pointedly said, "The same germ that causes disease in the negro will cause it in the white."

In the preparation of these tables, based on a small population, it is necessary to "smooth" the death curve to some extent to cover the fluctuations which always appear in small groups of deaths, but these tables are based on actual reported ages and not prepared from "age groups," so that the tendency of the curve was well established and but slight "smoothing" was necessary.

While from an actuarial standpoint these tables are possibly of slight value,

as a means of studying existing relative sanitary conditions they are of great value. It is to be regretted that there is not sufficient data available to make historic comparisons of the same groups.

A similar set of tables for Kansas City, Kansas and Jacksonville, Florida, further emphasize this but do not offer anything additional and are, therefore, omitted.

Thanks are hereby extended to George C. Whipple, professor of sanitary engineering, Harvard University, under whose direction this work was begun.

HISTORIC COMPARISON—EXPECTATION OF LIFE TABLES.

Massachusetts.

	Expectation of Life in Years.			
Age.	*1860.*	*1880.*	*1900.*	*1910.*
Under 1	44.23	41.77	45.31	49.50
1	49.90	50.74	54.02	56.68
2	51.50	52.81	55.46	57.79
3	52.52	53.27	55.52	57.45
4	53.09	53.50	55.14	56.93
5	53.22	53.30	54.75	56.28
10	49.88	50.61	50.82	52.17
15	46.18	46.38	46.69	47.60
20	42.65	42.78	42.50	43.52
25	39.70	39.62	38.43	39.33
30	36.65	36.31	34.86	35.40
35	33.43	33.0	31.26	31.55
40	30.25	29.76	27.64	27.73
45	26.90	26.06	23.95	24.07
50	23.74	22.75	20.45	20.30
55	20.33	19.09	17.15	16.92
60	17.06	15.85	14.12	13.81
65	14.06	12.70	11.22	11.07
70	11.18	10.08	8.73	8.69
75	8.97	7.64	6.56	6.60
80	6.78	5.67	4.92	3.75
85	4.95	4.13	3.53	3.56
90	3.36	3.08	2.56	2.55
95	1.92	1.84	1.69	1.58

Indiana.

	Expectation of Life in Years.			
Age.	*1860.*	*1880.*	*1900.*	*1910.*
Under 1	39.14	46.55	52.50	54.53
1	44.49	52.26	57.36	59.50
2	46.69	53.62	58.05	59.30
3	48.36	53.91	58.0	59.50
4	49.12	53.88	57.42	58.85
5	49.13	53.61	56.71	58.09
10	47.60	50.58	52.62	53.86
15	44.50	46.79	48.61	49.50

Indiana—*Continued.*

	Expectation of Life in Years.			
Age.	*1860.*	*1880.*	*1900.*	*1910.*
20	41.40	43.34	44.98	45.38
25	38.40	40.18	41.45	41.68
30	35.40	37.0	38.01	37.82
35	32.36	33.70	34.35	33.91
40	29.27	30.64	30.64	30.05
45	25.99	27.14	26.89	26.21
50	22.52	23.79	23.13	22.36
55	19.20	20.31	19.48	18.63
60	16.15	16.98	16.15	15.16
65	13.16	14.04	12.84	11.92
70	10.45	10.77	9.97	9.21
75	8.02	8.20	7.83	6.75
80	6.09	6.35	6.17	4.90
85	4.64	4.98	4.20	3.43
90	3.32	3.69	2.72	2.54
95	2.05	2.16	1.80	1.55

Ohio.

	Expectation of Life in Years.			
Age.	*1860.*	*1880.*	*1900.*	*1910.*
Under 1	57.76	51.50	53.70	54.62
1	60.80	57.14	58.55	59.70
2	61.72	58.22	59.13	60.12
3	62.25	58.41	58.84	59.68
4	62.30	58.08	58.42	58.95
5	62.09	57.66	57.77	58.26
10	59.18	54.41	53.82	54.02
15	54.86	50.19	49.38	49.61
20	51.13	46.28	45.45	45.39
25	47.46	42.86	41.74	41.48
30	43.87	39 27	38 06	37.61
35	39.98	35.62	34.31	33.78
40	36.22	31.96	30.52	29.88
45	32.40	28.26	26.82	26.11
50	28.55	24.48	23.08	22.32
55	24.75	20.77	19 42	18.77

OHIO—*Continued.*

	Expectation of Life in Years.			
Age.	*1860.*	*1880.*	*1900.*	*1910.*
60	20.95	17.16	16.01	15.33
65	17.36	13.80	12.76	12.19
70	13.97	10.87	9.98	9.34
75	10.95	8.31	7.62	6.95
80	8.05	6.18	5.66	5.27
85	5.31	4.61	4.07	3.66
90	2.97	3.30	2.78	2.79
95	1.42	1.78	1.48	1.62

MICHIGAN.

	Expectation of Life in Years.			
Age.	*1860.*	*1880.*	*1900.*	*1910.*
Under 1	57.59	53.26	51.79	57.11
1	60.65	58.25	57.95	61.32
2	61.03	59.08	58.52	60.80
3	61.05	60.09	58.37	60.30
4	61.08	59.10	57.83	59.58
5	61.09	58.72	57.18	58.80
10	57.75	56.05	53.05	54.59
15	53.46	52.11	48.82	50.15
20	49.46	48.45	44.86	46.23
25	45.74	44.79	41.18	42.15
30	42.14	40.39	37.54	38.18
35	38.24	37.15	33.76	34.19
40	34.25	33.23	30.05	30.26
45	30.38	29.23	26.24	26.25
50	26.58	25.44	22.48	22.45
55	22.90	21.54	18.82	18.79
60	19.55	17.89	15.34	15.26
65	16.30	14.41	12.20	12.06
70	13.12	11.37	9.32	9.26
75	10.43	8.74	7.0	6.84
80	8.27	6.30	5.11	5.04
85	6.19	4.45	3.63	3.74
90	3.85	2.75	2.57	2.54
95	2.02	1.65	1.49	1.62

CALIFORNIA.

	Expectation of Life in Years.		
Age.	*1880.*	*1900.*	*1910.*
Under 1	49.16	49.95	53.43
1	54.71	54.40	57.69
2	55.21	54.78	59.0
3	55.09	54.45	57.40
4	54.78	53.94	56.61
5	54.22	53.25	55.92

CALIFORNIA—*Continued.*

	Expectation of Life in Years.		
Age.	*1880.*	*1900.*	*1910.*
10	50.60	49.45	51.73
15	46.40	45.25	47.24
20	42.45	41.35	43.18
25	39.0	37.93	39.29
30	35.74	34.69	35.56
35	32.44	31.27	31.91
40	29.30	27.90	28.31
45	25.74	24.47	24.65
50	22.68	21.17	21.15
55	19.55	18.04	17.80
60	16.69	14.93	14.79
65	13.56	12.06	11.76
70	11.07	9.50	9.23
75	8.81	7.27	7.02
80	7.15	5.43	5.14
85	5.38	3.77	3.81
90	3.60	2.77	3.11
95	1.93	1.83	2.30

COMPOSITE OF MASSACHUSETTS, OHIO, INDIANA AND MICHIGAN.

	Expectation of Life in Years.	
Age.	*1860.*	*1910.*
Under 1	44.68	53.94
1	53.96	59.30
2	55.19	59.50
3	56.04	59.23
4	56.39	58.57
5	56.38	57.85
10	53.60	53.66
15	49.77	49.21
20	46.16	45.13
25	42.82	41.16
30	39.51	37.25
35	36.00	33.35
40	32.49	29.48
45	28.92	25.66
50	25.35	21.88
55	21.79	18.27
60	18.42	14.89
65	15.22	11.81
70	12.18	9.12
75	9.59	6.78
80	7.29	4.74
85	5.27	3.59
90	3.37	2.60
95	1.85	1.59

A STUDY OF METHODS OF SEWAGE DISPOSAL IN INDUSTRIAL AND RURAL COMMUNITIES AND SUGGESTIONS FOR THEIR IMPROVEMENT.

J. F. Siler, *Captain Medical Corps, U. S. Army;* P. E. Garrison, *Passed Assistant Surgeon, U. S. Navy, and* W. J. MacNeal, *Assistant Director of Laboratories, N. Y. Post-Graduate Medical School, New York.*

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I. Introduction.

THE main objects of this paper are to review briefly the usual methods of disposal of human excreta observed by this Commission* in the South, more particularly those in use in industrial communities; to discuss in detail actual improvements in methods of disposal which have been made in certain industrial communities, the amount of money invested in such improvements and maintenance charges for same; to outline the amount of capital required to put in modern sanitary improvements; and, finally, to consider the returns which may be expected on such investments, not only from the standpoint of improvements in the general health and efficieney of the community, but also the net income in money which may be earned.

For much of the material incorporated in this paper we are indebted to the presidents of Spartan Mills, Spartanburg, S. C., Dunean Mills, Greenville, S. C., Newry Mill, Newry, S. C., Republic Mill, Great Falls, S. C., and Erlanger Mill, Lexington, N. C. We desire also to make speeial acknowledgment to Mr. J. E. Sirrine, mill architect and engineer, Greenville, S. C., for estimates which he has very kindly had prepared for us.

II. Discussion of the Usual Methods of Sewage Disposal Adopted in the Southern States.

In investigating methods of sewage disposal in the southern states, the conclusion is inevitable that they are, in most sections and in many communities, most inefficient and unsatisfactory.

In rural communities the usual method of disposal provided is the open surface privy, though the whites occasionally, and the negroes frequently, have no provision whatever, as has been brought out by the investigations of the Rockefeller Sanitary Commission. This Commission reports that inspection of 189,586 farmhouses taken at random in eleven states, disclosed the fact that 95,988, or 51 per cent. of them had no privy, while the general sanitary index was only 5.8 out of a possible rating of 100.

Practically all towns and cities, of sufficient size to justify such expenditure, have sewage disposal plants. In certain sections of such towns and cities, with a few striking exeeptions, open surfaee privies are permitted.

The industrial communities with which this paper is more particularly concerned, are those devoted to the manufaeture of cotton cloth—cotton mill villages. When these cotton

*From the Robt. M. Thompson Pellagra Commission of the New York Post-Graduate Medical School.

mills are constructed it is customary for the owners to build in their immediate vicinity a complete village, including dwelling houses, stores, market, church, recreation hall and school. In most villages the tenants are also provided with a plot of ground for garden, and with stables and pasture for cows. In these communities the methods for disposal of human excreta are usually unhygienic and highly unsatisfactory. In many, the unscreened surface privy is the method adopted. In some a pail system is in use, and but rarely are such privies rendered fly-proof.

With such methods of disposal in force, correlated with congestion of population in these villages, the ill effects following soil pollution and contamination by mechanical means are vastly greater than is the case in rural communities, where the population is sparse and families live at much greater distances apart.

The methods of ultimate disposal in these industrial communities vary. In some the privies are built over ditches, surface water being relied on to remove the collections. The plan usually adopted is removal once a week by scavenger service. In some of the villages studied, a pail system (unscreened) has been installed and a regular scavenger empties each pail twice a week and carts the excreta away; in others the scavenger buries the excreta beside the privy once a week. In a few such communities no regular or systematic arrangement for ultimate disposal is in force, and the privies are cleaned at irregular intervals.

In arriving at the cost of maintenance for these inefficient methods of disposal, it is necessary to consider a number of factors, among which may be mentioned expenses incident to construction and repair of outhouses used as privies, wages of scavenger, cost of new pails to replace those worn out, interest on money invested in team and disposal cart, wear and tear on wagon and team, feed for team and other incidentals.

We have endeavored to obtain these figures from the mill authorities of eleven mills. The cost of maintenance varied considerably and was contingent upon the efficiency of the system in force. The main item of expense was that of the scavenger, whose wages per year ranged from $130 to $360.

The figures given us as covering total maintenance charges ranged from $200 to $630 per annum, the average being $435. The communities considered had population of from 600 to 1,800 people.

III. Discussion of Efficient Methods of Disposal Adopted in Certain Communities.

In some rural communities, in some towns and cities, and in a few industrial communities investigated, sanitary conditions were much above the average. It is our intention to discuss in detail but one phase of these sanitary advances, namely, improvements in sanitation in industrial communities.

In rural districts the health authorities in many of the southern states are already making much progress. The Rockefeller Sanitary Commission

is at the present time adding great impetus to this work through its efforts to organize model rural communities in many of the southern states.

In many towns and cities the governing authorities are beginning to have some conception of the benefits accruing from modern methods of sanitation and are enacting ordinances looking to the institution of such methods. As one example of what may be accomplished, we cite the city of Spartanburg, S. C., with a population of 17,517 (census 1910). In the fall of 1913 an ordinance was enacted, at the suggestion of the city health authorities, requiring that all residences within 300 feet of a sewer main install water closets and that all located beyond this limit be provided with sanitary closets —pail system, fly-proof. Dr. C. F. Kaupp, the health officer, informed us in October, 1914, that during the past year 1,000 sewer connections had been made and 1,500 sanitary privies installed. This was accomplished with a negligible number of prosecutions. It must be understood, of course, that prior to the passage of this ordinance, sanitary conditions in Spartanburg were as good as those usually encountered in cities of like size in the southern states.

In industrial communities but little progress has been made. The major part of the work of this Commission has been undertaken in the Piedmont section of South Carolina, where the development of cotton manufacture during the past twenty years, has been phenomenal. The usual methods of sewage disposal in these communities—unscreened surface or pail privies—have already been considered.

In a few mill villages which we have studied, the authorities have seen fit to install water-carriage sewage disposal plants. As a number of inquiries have reached us concerning the cost of installation of such systems, we consider it desirable to present such information as we have been able to collect. This information will be discussed from two points of view; first, original cost of disposal plant (permanent improvements); second, maintenance charges.

A combined sewage disposal plant and water supply system has been installed in the Spartan Mill Village. Spartanburg, S. C. This village has 270 houses, some of which are double. Three hundred and sixteen separate connections were made. Installations were begun in September, 1913, and completed in May, 1914.

Permanent Improvements.—The sewage disposal plant for the 316 tenements including sewers, plumbing, non-freezing flush closets and other fixtures for houses, water connections for closets, and an undetermined number of water connections and kitchen sinks for domestic purposes, cost approximately $25,000 or at the rate of $79 per house.

A piped water supply for domestic purposes had been installed in a number of these tenements or on their premises, prior to the installation of the sewage disposal plant, but many such connections were made when water closets were placed in the houses. No separate figures were available covering the cost of the water supply system, and part of the $25,000 ex-

pended should justly be charged against the water supply system. The system adopted provides fire plugs for fire protection, thereby reducing insurance rates.

It may conservatively be estimated that the cost of the combined water and sewerage system in this village did not exceed $39,000.

No septic tank was provided, as the sewer mains become continuous with those of the city.

No independent source of water supply was provided, the supply being purchased from the city at a flat rate.

Closets were built onto the back porches at a cost of approximately $1,580.

Maintenance Charges.—The company pays the city a flat rate of $2,460 per annum for water for the combined system, and it is estimated that it will cost $600 per annum for repairs and up-keep Thus the actual maintenance charges amount to $3,060 per annum. To offset these maintenance charges, the company requires each tenant to pay $1 per month additional rent to cover sanitary conveniences. It is estimated that at least 290 of the 316 houses are occupied at all times, from which the income is $3,480. This leaves approximately $420 to cover interest on the investment of $39,000 or about 1 per cent. If to this be added the $500 paid out annually for maintenance of the old system—unscreened trough closets—together with the decrease in insurance rates following better protection against fire, the income on the investment will be approximately 2 per cent.

The main item for maintenance is that paid for water, $2,460, and this item was much less in all of the other villages investigated.

The Erlanger Cotton Mill at Lexington, N. C., was completed in April, 1914 and has 83 tenements. This village, which is a model one, has a water system supplying water for domestic and all other purposes, a complete sewage disposal plant including septic tank, a complete lighting plant supplying electric lights for streets and houses, a sanitary service for kitchen and other solid wastes, and the houses are completely screened.

Permanent Improvements.—The sanitary conveniences enumerated above were placed in 83 tenements at the following cost:

Sewage disposal plant (sewer mains, house connections, plumbing, and inside fixtures)	$10,309
Water system (mains, house connections, plumbing, inside fixtures and kitchen sinks)	4,808
Septic tank	1,522
Water supply (driven wells, pump and motor)	2,500
Service tank (capacity 50,000 gallons)	2,847
Street and house lighting equipment,	4,000
Garbage cans	100
Screening houses	500
Total cost of all these improvements was	$26,586

Maintenance Charges.—It is estimated by the superintendent of this mill that it cost them $200 for pumping water and maintenance of these systems, $600 for lighting the streets and houses, and $508 charged off to cover depreciation, this amount being 2 per cent. of the total amount invested in sanitary improvements. This makes a

total of $1,308 to cover all maintenance charges.

The rental charge for tenements in this village is 25 cents a week per room and it is estimated that 85 per cent. or more of the tenements are occupied continuously. The total income from this source is $3,536 per annum. The rental charge for tenements in villages without such improvements averages about 12½ cents per week a room, and half of the total income—$1,768—should justly be credited as returns on the investment in sanitary improvements. The net returns, after deducting charges for maintenance, lighting and depreciation, are $459, or 1.7 per cent.

It will be noted that everything possible has been done to safeguard the health of this community. Not only has this village the sanitary improvements just outlined but its executive heads have also employed a trained nurse whose entire time is devoted to the care of its sick and to instruction of the inhabitants in hygiene. Though only a small net return is shown on the amount invested, we are informed that the owners are perfectly satisfied with the investment and are confident that the better health conditions and greater contentment of the inhabitants will more than repay them.

We feel very confident that the degree of efficiency shown by mill operatives living under the sanitary conditions existing in this village as compared with that of operatives in the usual type of mill village in the South will demonstrate very clearly that, from this point of view alone, it will pay to install such improvements.

The Dunean Cotton Mill at Greenville, S. C., has a complete water system and sewage disposal plant for its 151 tenements. The sanitary improvements consist of a water system supplying water for domestic and flushing purposes and a complete sewage disposal plant including septic tank and filter beds.

Permanent Improvements.—The water and sewage disposal plant was installed in 151 tenements at the following cost:

Sewage disposal plant	$15,940
Water system	6,835
Service tank (50,000 gallon capacity)	3,020
Septic tank and filter beds	4,200
Driven wells, pump and motor	3,500
The total cost of these permanent improvements was	$33,495

Maintenance Charges.—No figures were available covering maintenance charges for these systems. The president of this mill informed us that it cost them about $50 *per annum* for repairs to pipes and water closets and that the engineer who cared for the pump spent the greater part of his time in the machine shops of the general plant.

The rental charge for tenements in this village is 75 cents a month per room, which is said to be the usual charge for mill tenements in Greenville, S. C., without sanitary conveniences.

The interesting observation was made that all tenement houses in this village were occupied continuously and a waiting list of families was always on file.

The Republic Cotton Mill Village at Great Falls, S. C., erected about

four years ago, is another model village. It has 100 tenements with a complete sewage disposal system, water system, and electric lights in each house.

Permanent Improvements.—The sewage disposal plant consists of sewer mains, house connections, closets in 100 tenements and also in the hotel, office, store, school and all other public buildings except the mill proper, which was under separate contract. The outlet of the sewerage plant is into the Catawba River about one mile below the plant.

The water system is quite an elaborate one supplying pure water for all purposes. The water is taken from the Catawba River and passes through a settling basin (300,000 gallon capacity), gravity and pressure filters, and finally through an ozonizing plant (Gerard system).

We were informed by the president of this mill that the total cost of these very elaborate improvements—water and sewerage systems—was $20,529.51.

Maintenance Charges.—It is estimated that the maintenance charges for the water and sewerage systems, exclusive of repairs, are not more than $150 *per annum*. The cost of repairs has been surprisingly low, not more than $100 *per annum*. The total expense for maintenance and upkeep was therefore about $250.

The usual rental charge for mill tenements in this section, without sanitary conveniences, is 75 cents a month per room, while the charge in this village is $1. The difference of 25 cents may justly be credited as direct returns on the investment. The superior type of houses in this village and the sanitary improvements which have been made attract the best and most efficient class of mill operatives. For this reason all the houses are occupied continuously and the income to be credited to improvements in sanitation is about $1,200 *per annum*. Deducting from this income the charges for upkeep and repairs ($250) and 2 per cent. on the original investment to cover depreciation ($410) there remains $540, or a direct return of $2\frac{1}{2}$ per cent. on the original investment.

That this by no means represents the actual returns on this investment is evidenced by the following quotation from a letter to us from Mr. R. S. Mebane, president of this mill:

"Since we charge 25 cents more per room per month than the average mill village in our section, we feel that this 25 cents should be credited to returns on the investment in modern sanitary improvements, and we figure this pays us a small return on the investment.

"As a matter of fact, this is not by any means what we consider to be the actual returns to us from this investment. We are convinced that by giving our operatives their comfortable, sanitary, well-lighted houses, with pure drinking water, we are actually repaid by the superior class of labor we are able to secure. We have no transient families here, so to speak, but our families continue on with us year after year, happy and satisfied. We believe the money spent for the purposes above mentioned is a direct contributory asset to the earning capacity of our

plant. We have never had any sickness to amount to anything here, and we consider it quite a remarkable statement that we have never had a case of typhoid fever. We have no wells or springs on our premises and all of our operatives are forced to use pure sterilized, ozonized water. We are so thoroughly convinced of the wisdom, from a business standpoint, of the investments above described that should we build any more plants here we are going even further along this line."

The Newry Mill in Oconee County, S. C., with a total population of 750, installed a sewage disposal plant when the mill was erected in 1892. The water closets are grouped in wooden out-houses, conveniently placed to the houses they serve. The water supply for this system is pumped directly from a nearby stream into the distributing tank. The drinking water for the village is obtained from open wells.

Mr. Courtenay, the president, informed us that the entire expense of maintenance for this system, aside from the labor of two general repair men, did not exceed $100 a year. The repair men referred to were of necessity carried on the payroll for general inspection and repair work in the village and not more than one hour per day of their time was devoted to repairs on the sewage disposal plant.

IV. Discussion of the Returns, Both Indirect and Direct, Accruing from Improvements in Sanitation.

There is but little doubt that prevention of soil pollution is one of the most important public health problems confronting the South today. Furthermore, this problem is most acute in industrial communities where, by reason of congestion of population, its ill effects become most apparent.

In certain of the southern states the expansion and growth along industrial lines during the past twenty years has been phenomenal. One industry in particular, the manufacture of cotton, has been expanding with great rapidity. The following figures, taken from the Reports of the Thirteenth Census, enable one to realize its growth. In 1899 there were in the states of Alabama, Georgia, North Carolina and South Carolina, 355 cotton factories employing 88,710 individuals, while ten years later (1909) the number of factories had increased to 595, employing 136,403 individuals. Statistical information which we have gathered indicates that each operative represents a population of about 2.3 individuals, so that it may safely be assumed that the total population of the cotton mill villages in the four states mentioned is at least 300,000.

The sanitary conditions in most of the coal mining camps, so far as we have been able to determine, is very similar to that existing in the usual cotton mill village.

In practically all of the industrial communities which we have investigated most intensively, we have observed, with great frequency, epidemics of typhoid fever and bacillary dysentery which could be traced to soil pollution. In one village there were epidemics of typhoid, bacillary dysentery and malaria at the same time.

The typhoid fever and dysentery were due in large measure to pollution of the open wells from improperly constructed sewers, and when a piped water supply was provided these two diseases were greatly diminished.

We have outlined in the forepart of this paper the methods of disposal adopted in cotton mill villages, and it seems hardly necessary to add that such methods are altogether unsatisfactory and a menace to public health.

The question then presents itself, How can this problem best be met? The ideal solution is, of course, the installation of water systems and sewage disposal plants, if this be practicable, and we believe it to be so, if not in all, certainly in many such communities.

The stockholders in these mills are, of course, looking to those in immediate control for reasonable returns on their investment, and before expending from $15,000 to $40,000 in permanent sanitary improvements, the executive heads must necessarily be convinced that the investment will show a profit either indirectly, directly, or both.

Indirect Returns.—Some executives are content with indirect returns on the investment, that is to say, the contentment of the people and better health conditions. These factors make for greater efficiency, and, after all, the degree of efficiency shown by the operatives is the determining factor governing success. We have investigated general health conditions in mill villages with proper sanitary conveniences and in those without such conveniences. The almost complete absence of typhoid fever, diarrheas and dysenteries in the former as compared with their usual great prevalence in the latter has been forcibly impressed upon us. Any measures which tend to better health conditions in these communities by the control of disease naturally result in an increase in efficiency. We feel perfectly confident that investments in sanitary improvements will yield abundant returns in this indirect fashion. This feeling of assurance is based mainly on information given us by executives of mills relative to actual amount of manufactured products which their mills make up from week to week and from month to month.

Direct Returns.—Dismissing, however, the question of indirect returns, is it possible that such investments can be made to show direct returns, that is to say, a reasonable rate of interest on the capital invested? We believe that in most instances it will, provided the rental charges be increased sufficiently to cover such improvements. An increase of between $1 and $2 per month will usually be amply sufficient to show a small direct return on the investment.

This brings up the question as to whether an additional charge is justifiable under the prevailing labor conditions in the South, and as to whether the objection on the part of the tenants to paying such charges will be so great as to upset local labor conditions. In the Piedmont section of South Carolina the rental charge for the mill village tenements averages about 50 cents a room per month. These tenements usually have from 3 to 6 rooms, so that the house rent per month ranges

from $1.50 to $3. The income from this source is supposed to cover necessary expenditures for repairs, painting, etc., but we have been informed by a number of mill executives that such is not the case. It follows, therefore, that there is no direct monetary return on the capital invested in tenements and land on which they are erected. The executives of the mills consider that the difference between the rents actually paid and the rents which should be paid in order to show a reasonable income on the capital so invested, represents, in fact, a part of the gross earnings of the operatives. This becomes quite an item in mills situated in towns and cities, as the type of house similar to those found in these villages rents at from $9 to $12 per month. In fact, we know of a few instances in which the mill workers owning property in the vicinity of such mills follow the practice of renting their own houses at $10 or more per month and living in mill houses at $3 per month.

As to actual wages paid employees in cotton mills, the 1910 Report of the Bureau of the Census shows that in 1899, in the state of South Carolina, there were 30,621 individuals employed in cotton manufacture, the wages paid them amounting to $5,067,000, or an average of $165 per year for each individual. In 1909 there were 46,342 persons so employed and their wages had increased to $11,661,000 or $352 per year for each individual. The number of wage-earners in each family varies from 1 to 5, or even more, the average being about 2. We have been informed that the *per diem* wage paid adults in these mills 20 years ago was 60 cents while now it is from $1 to $1.20.

Twenty-six per cent. of the employees of 6 cotton mills intensively studied in Spartanburg County were individuals from 12 to 16 years of age, and it was not at all unusual to find that employees of this age earned from 85 cents to $1 or even more per day. Some of the adults earned $2 per day or even more on piece work. We know of many families earning between $125 and $175 per month. The average number of operatives per family in the Piedmont section of South Carolina is about 2, and it may safely be estimated that the income per family will average at least $50 a month, and probably more. The industrial population in the Piedmont section expends much of its earnings injudiciously. They are a boon to patent medicine fakirs, itinerant peddlers and local establishments doing business on the so-called "installment plan." The managers of the mill company stores, without exception, tell us that they will buy no foodstuffs other than those of the best quality. In the course of a house to house canvass of the Spartan Mill village in Spartanburg, S. C., one of us interrogated each housewife in about 50 of the tenements as to whether she was pleased with the recent improvements in sanitation—a water system for domestic use and flush closet in each house—and if the family objected to paying $1 for these conveniences. With one exception, their reply was that it was infinitely superior to the old system, and that they did not object to the extra charge of $1 per month.

Other members of our working party have occasionally been told by tenants that in their opinion the mill company should not make extra charges for sanitary improvements.

When one has seen, as we have, the great prevalence of typhoid fever, bacillary dysentery, hookworm disease and summer diarrheas in these communities, we feel that there will be no hesitancy in concluding that the expenditure of from $1 to $2 per month by each household for improvements in sanitation will result in greater contentment, markedly better health conditions and the natural correlative, increased efficiency and greater earning power.

If it be granted that it will entail no hardship on the occupants of houses in these communities to pay additional rents of from $1 to $2 per month to cover sanitary improvements, can the executive heads of these industries look forward to a reasonable return on the amount invested in permanent sanitary improvements? We believe that in almost all instances this can be answered in the affirmative. We have discussed already the cost of installation of permanent sanitary improvements in 5 mill villages, these improvements ranging from one having a sewage disposal plant only, to those with elaborate systems for the purification of the water supply as well as complete sewage disposal plants, electric lights, screened houses and other sanitary conveniences.

The actual cost of installation of water systems or sewage disposal plants or both, will vary in different sections. For example, it might be possible in one locality to secure a potable and adequate supply of water from driven wells at moderate expense, or even from such wells already in use, while in other localities the supply would have to be obtained directly from streams, necessitating the installation of one of the more expensive plants for purification by mechanical or chemical methods.

The sewage disposal plant would also offer problems for solution. Practically all of the older mills in the Piedmont section of South Carolina are built alongside streams, the villages themselves being built on the adjacent hillsides. Superficial examination of these villages might lead one to conclude that by reason of broken topography, the cost of installing a sewage disposal plant would be prohibitive—in fact, we have had mill executives offer this as their main argument against making such improvements. As a matter of actual fact, engineers have informed us that the topography of such villages could very frequently be used to great advantage in actually reducing quite materially the cost of construction.

Another question which merits careful consideration is the final disposal of the sewage. In most instances streams are available into which the sewage may be discharged.

In some of the southern states laws have already been enacted requiring industrial communities to submit their sewage to some one of the approved methods of treatment before it is discharged into streams. A number of cotton mills have complied with this law, more particularly those erected

during the past five years. Comparatively few of the cities and towns of the South have plants for the treatment of sewage, and we know that a very large number discharge their untreated sewage into streams which are manifestly of insufficient volume to care for it properly. There are cities and towns in the South having within their corporate limits mills which have complied with the state laws governing treatment of sewage, while these cities and towns discharge immensely larger volumes of untreated sewage into nearby streams. If mill corporations are required, by law, to treat the sewage from their plants, municipalities with sewage disposal plants should certainly be required to do the same thing, provided the streams for ultimate disposal are not of sufficient volume properly to care for it.

The advisability of discharging untreated sewage into streams will depend mainly on the relative volumes of the sewage and the stream of water into which it flows, the character of the water, and the use to be made of the water lower down stream. In most cases it would be desirable to submit the sewage to some one of the approved forms of treatment before its discharge into streams. The method of treatment usually to be recommended would be the septic tank followed by passage over filter beds.

For the reasons which we have mentioned, as well as many others, it is very necessary that engineers competent to deal with all the problems connected with the installation of sanitary improvements, be consulted, otherwise grave errors are possible, or unnecessary expenses may be incurred.

Mr. J. E. Sirrine, an engineer of Greenville, S. C., has furnished us estimates based on actual construction, showing the average cost of installing the different units of water and sewerage systems in industrial communities, which may be summarized as shown in the table on the following page.

Practically all the figures given in this table are based on averages obtained from actual construction. In some localities they would be much lower, while in others they might be in excess.

Taking the Erlanger Mill at Lexington, N. C., as an example, we find that their sewage disposal plant (including septic tank) and water system would cost, according to these estimates, $19,535. These units actually cost them only $16,495.

The cost of maintenance and upkeep for these improvements also varies and is dependent on local conditions. In industrial communities certain of the overhead charges necessary in municipal plants would be much reduced. The engine-room force for the mill proper could care for the pumping plant without additional expense, and as it is also necessary for these mills to employ mechanics, carpenters and inspectors for general work around the plant, this force could attend to repairs on the sewerage and water systems at but little extra expense—probably averaging not more than an hour a day. The cost of pumping the water by electricity also would vary. In mills generating their own power, the current would cost about $200 a year for pumping 50,000 gallons of water per day, based on 2,880 k w. hours per month. If the current is pur-

Units.	Cost per house on basis 100 installations	Total cost villages with 100 houses.	Cost per house (approximate).	
			Basis 150 houses.	Basis 300 houses.
Sewage Disposal Plant, including sewer mains, sewer connections, and inside plumbing including flush closets	$131.94	$13,194.00	$124.81	$121.25
Water System, including mains, house connections and plumbing, water to be used for flushing closets only	$58.21	$5,821.00	$51.58	$44.95
Water System, including mains, house connections, kitchen sinks and plumbing, water to be used for domestic purposes and for flushing closets	$68.21	$6,821.00	$60.58	$51.95
Water Tank, Capacity, 50,000 gallons for 100 houses. Capacity, 100,000 gallons for 300 houses	$28.47	$2,847.00	$19.00	
Driven Well, deep, including installation pump and motor to operate same. Capacity, 50,000 gallons, 24 hours	$25.00	$2,500.00	$16.66	
Driven Well, deep, including installation pump and motor to operate same. Capacity, 100,000 gallons, 24 hours				$15.00
Filtration Plant, capacity, 50,000 gallons	$20.00	$2,000.00	$13.33	
Filtration Plant, capacity, 100,000 gallons				$10.00
Septic Tank	$15.22	$1,522.00	$10.00	$10.00

chased the cost would be greater. The expenses incident to repairs can be kept at a low level by the installation of a non-freezing type of flush closet, by boxing in the water pipes and lining with cotton seed hulls to prevent freezing, and by frequent inspections.

Using these estimates as a standard, we find that a complete sanitary system for a village of average size with 150 installations, including sewage disposal system with septic tank, complete water system supplying water for domestic and for flushing purposes, water tank of 50,000 gallons capacity and driven wells with pump and motor to operate same, would cost approximately $34,677. Interest on this amount at 5 per cent. amounts to $1,733. It may conservatively be estimated that at least 135 of the tenements in such a village would be occupied at all times. Based on a charge of $1.50 per month per house for sanitary conveniences, the income would be $2,430. After deducting the interest charges on the original investment, about $700 still remains to cover maintenance charges

and upkeep. This amount would be amply sufficient provided pumping charges were reasonably low.

In the case of mills located within the corporate limits of cities or towns already provided with water and sewerage systems, the expense incident to the installation of such plants in the mill village proper, would average about $27,808 for villages of 150 houses. The yearly income, based on a charge of $1.50 per month, estimating that 135 houses were occupied continuously, would be $2,430. If water for such a system were purchased from the city or town at a flat rate, it would cost about $1,200 a year. Adding to this the expenses for maintenance and upkeep, which should not be more than $400 per annum, only $830 remains to be credited as interest on the investment (3 per cent.). If to this be added the cost of maintaining a surface or pail system with a scavenger service which would otherwise be necessary, the net income would be 5 per cent.

We are quite convinced that the sewage disposal problem in industrial communities is capable of solution on some such basis as that outlined herein.

It has not been the aim of this paper to discuss in detail the improved health conditions, increased efficiency, and other features which have so frequently been shown to follow efficient sanitary methods. We believe, however, that if health authorities will, in some detail, explain this aspect of the problem to the executive heads of these industries, and can show them, in addition, that a moderate return may be expected on the capital invested, many such executives will not hesitate to install efficient water and sewage disposal plants.

We would also offer the suggestion that health authorities keep closely in touch with corporations contemplating the establishment, in their states, of any industries necessitating the creation of concrete communities, in order that the desirability of installing efficient water and sewerage systems may be brought to their notice. These plants can be installed much more satisfactorily and more economically as part of the original construction than at some subsequent date.

Summary.

1. In Southern rural districts about half the population is without any provision for disposal of excreta. In towns, open surface privies are generally used, in fact even in many cities in which water carriage systems are found. In industrial communities, open surface privies are most usual, water carriage systems rare.

2. Complete water systems and sewage disposal plants can be installed in cotton mill villages at an expense varying from $210 to $265 per house. A rental charge of one to two dollars per house per month for such improvement would suffice to maintain it and also yield a small interest return on the investment.

3. A very considerable benefit to the community as a whole by improved hygienic conditions and to the particular industry through increased efficiency of the workers may confidently be expected as a result of these improvements.

THE FATE OF BACTERIA IN FROZEN MEAT HELD IN COLD STORAGE, AND ITS BEARING ON A BACTERIOLOGICAL STANDARD FOR CONDEMNATION.

John Weinzirl and E. B. Newton,
University of Washington, Seattle.

Read before the Laboratory Section, American Public Health Association, Jacksonville, Fla., December 2, 1914.

In an earlier paper (Am. Jour. Pub. Health, Vol. 4, p. 413), the writers reported the results of bacteriological analyses of market hamburg steak; it was found that such steak frequently contains large numbers of bacteria, but at present there exists no bacterial standard for condemning such product. We attempted to find a bacteriological standard equivalent to the organoleptic test, but this proved impracticable. We then proposed an arbitrary bacterial standard for meat and suggested that the limit be placed at 10,000,000 bacteria per gram.

The advantages of a standard are obvious and need not be recounted. Likewise such a standard is apt to carry some disadvantages, and it is only fair that the disadvantages should be considered. It would seem that the refrigeration of meat would interfere seriously in applying a bacteriological standard. It is well known that bacteria die when subjected to low temperatures for long periods of time; accordingly, it would seem that meat which should be condemned by our standard would yet escape condemnation if held in cold storage for a time. The contention may be raised that no standard would condemn meat while frozen, for ammonia and other putrefactive products would not be given off in sufficient quantities. Again, it is not necessary to abandon the organoleptic test simply because we have a bacterial standard. Besides it does not appear to be entirely clear just how refrigeration affects the edibility of products. May it not actually improve a poor product?

Effect of Refrigeration on Bacterial Content.

The present investigation was undertaken to determine the extent to which refrigeration interferes with the bacteriological standard. For this purpose, ten samples of hamburg steak were kept in the laboratory until all showed a positive organoleptic test, and also ammonia by Eber's test. The samples were analyzed bacteriologically, then frozen and placed in cold storage at a temperature of -10° C. Periodically, portions were removed and analyzed to determine the changes in bacterial content. The analyses were made with $1\frac{1}{2}$ per cent. agar, $1\frac{1}{2}$ per cent. acid and incubation at 28° C. for five days. To emulsify the meat samples, they were triturated with sterile sand in a sterile mortar as previously described by us (Am. Jour. Pub. Health, Vol 4, p. 408). Under these conditions the analyses gave the following results:

TABLE I.

GIVING BACTERIAL COUNTS OF SAMPLES OF FROZEN HAMBURG STEAK KEPT AT 10°C.

	July 16, 1913.	July 29, 1913.	Nov. 9, 1913.	Apr. 11, 1914.	July 28, 1914.
1	112,000,000	62,000,000	35,000,000	15,000,000	12,000,000
2	525,000,000	35,000,000	45,000,000	32,000,000	15,000,000
3	127,000,000	51,000,000	16,800,000	11,000,000	5,500,000
4	150,000,000	22,000,000	20,000,000	8,200,000	6,500,000
5	112,500,000	37,500,000	12,400,000	10,000,000	8,000,000
6	112,500,000	28,500,000	10,000,000	8,500,000	6,000,000
7	187,500,000	13,700,000	9,000,000	4,400,000	2,000,000
8	192,500,000	58,000,000	34,000,000	22,000,000	17,000,000
9	282,000,000	43,500,000	37,500,000	16,000,000	10,000,000
10	120,000,000	23,800,000	10,500,000	8,000,000	2,000,000
Average	192,000,000	37,000,000	23,000,000	13,000,000	8,000,000

The table shows that all the samples contained excessively high numbers of bacteria when placed in refrigeration, the average of the ten being 192,000,000 bacteria per gram. At the end of two weeks a tremendous drop occurred, the average now being 37,000,000 per gram; this gives a decrease to one-fifth of the original number. When analyzed after a period of approximately four months, the number had again fallen, but not so markedly, the average now being 23,000,000 per gram. At this time one of the samples would pass the 10,000,000 standard provided it was not thawed out before being placed upon the market.

The samples were again analyzed after the lapse of nine months and this time the average fell to 13,000,000 bacteria per gram; four of the samples would pass our proposed standard. When analyzed after one year, the average fell to 8,000,000 and six of the ten samples would pass the bacterial standard. It would appear, therefore, that the refrigeration of spoiled meats would seriously interfere with the employment of the bacterial standard. All of the samples showed advanced putrefaction when placed in refrigeration. It is obvious that if only questionable samples had been taken for the test, these would easily have passed the standard. It is plain, therefore, that the standard cannot well be applied to frozen meats, except in extreme cases. It is also plain that with the present practice of thawing meats before placing them on sale, the above samples would not evade the bacterial standard very long; indeed, it is doubtful whether they could have passed it at all.

The above consideration naturally suggests the question, what has been the effect of the twelve months' refrigeration upon the condition of the samples with respect to the organoleptic standard? As might be expected,

judgments varied as to whether they should be condemned; there was no question, however, but that their condition had apparently improved. Putrefaction having been arrested, part of the odor escaped, and the samples were pronounced fit for food by one observer. Apparently refrigeration would tend to upset the organoleptic test as well as the bacteriological test.

Summary.

By way of summary, we find:

(1) Samples of hamburg steak which far exceeded our limit for bacterial count and were plainly unfit for food, after one year of refrigeration at $-10°$ C., six of the ten samples would fall within the 10,000,000 standard; they were likewise improved in odor and might even pass the organoleptic test.

(2) If the samples were thawed before placing them on the market, they could not long escape either test.

(3) The bacterial standard compares favorably with the organoleptic test even when applied to meats refrigerated for one year.

EXPERIENCES WITH REFUSE COLLECTION AND DISPOSAL WITH REFERENCE TO ODORS.

Samuel A. Greeley,
Chicago, Ill.

Read before the Sanitary Engineering Section of the American Public Health Association, Jacksonville, Fla., December 2, 1914.

THE question of odors resulting from the collection and disposal of municipal refuse greatly needs the development of public opinion along rational lines. Recently the location of a garbage disposal plant in a large city received much public discussion. A city official in urging the removal of the plant from one location to another argued that the residents near the old location had suffered their share of odors from city garbage. Later, in urging the purchase of a new site, he described in glowing terms the sanitary and odorless plant to be erected there. Unfortunately, the first argument was not forgotten and the plant location was not changed. The matter should have been determined on other grounds as well.

The odor question should be met squarely, with due consideration of the cost of removing the plant to another location and of suppressing the odors altogether. Odors from manured lawns, tanneries, slaughter houses and other industries are tolerated in many places, because they are concerned in the livelihood of many, and cause an inconvenience from odors not commensurate with losses that would follow the loss of the industry. Projects for the location of refuse disposal plants should not be based solely on the odor question, but on the great-

est benefit to the largest number of people at a fair cost.

These comments are not advanced as an argument that odors from the collection and disposal of garbage are necessary or that every reasonable means should not be taken to avoid them. The point at issue is that the presence of relatively small odors should not prevent the carrying out of a needed public improvement on an economical basis. In other words, a fair distinction should be made between odors and a "public nuisance."

In refuse disposal work, odors come chiefly from garbage and quite as often from the collection of garbage as from its disposal. It is entirely feasible to control and suppress odors from the decomposition of garbage to a safe and reasonable minimum.

It should be remembered that unclean garbage wagons will carry their odor all along their route. Such odors are noticeable two to three hundred feet from the wagon. They can be eliminated by the selection of a type of wagon easily cleaned, with a good cover, and by washing the wagon at regular intervals. The European practice is to wash the collection wagons daily. The practice is growing in this country, particularly during the summer months. Washing wagons on alternate days will materially reduce odors but will not eliminate them. With only two washings a week, odors will surely develop in garbage collection wagons in warm weather. Odors in the wagons will be reduced if the garbage is collected at least every other day in the summer months.

Odors from garbage disposal are also subject to control through proper design and operation. The cost for suppressing odors must be judged after due consideration of the character of the neighborhood. The garbage of a city of some 300,000 people is disposed of by burning with coal. The quantity of coal used amounts to about 150 pounds and costs $0.25 per ton of garbage. With this quantity of coal, it is inevitable that odors should at times escape from the chimney top. I have seen a thick brown smoke coming from the chimney. To completely eliminate this condition, would require the use of more coal at an increased cost of disposal per ton, which might amount to $0.15. Yet this plant is considered a success by the people in this city and is widely advertised in that light. There would seem to be no justification for the additional amount of coal and extra cost required, in this instance, to eliminate the odors.

Reduction plants have, in the past, come in for a large share of public criticism because of odors. The balance between the elimination of odors and the cost thereof had not been properly adjusted. This was because many reduction plants were operated by contractors who had no incentive to spend money unproductively to suppress odors. A great deal of improvement has been made during the last few years. A new reduction plant has recently been put into operation at Schenectady, N. Y. This plant is attractively housed and its location is near other buildings and indicates a growing confidence in the possibility of reducing odors from a reduction plant.

The odor question as relates to the workmen at the disposal plant, is not so important as the general cleanliness of the plant and its freedom from dust. Attention to these details will promote odorless operation. Odors, in themselves, are not injurious to health.

In small towns, where the method of disposal may be by burial or feeding to pigs, the odor question will not be so acute. Isolated locations are generally available, where the odors should not be more of a nuisance than those from a farm pig-pen. Odors and nuisance will more often arise from the uncontrolled dumping of garbage in vacant lots near residential districts. I have known odors from such an uncovered dump to carry three-quarters of a mile. The remedy lies in stricter supervision by public officials rather than in large expenditures for improved methods.

The structural details for suppressing odors at refuse disposal works are not within the scope of this discussion. Good construction, however, is essential. Poor construction is an important cause of odors. Incomplete combustion may result from broken grates and cracked furnace walls. These defects are inevitable with bad foundations and poor furnace construction. In reduction works, floors and conveyors should be substantially built with ample provision for washing. Many details of construction, if properly carried out, will materially assist in the elimination of odors. All these matters should be taken up in the design. Both faulty design and construction are difficult to correct later and should be given competent attention in the first place.

Summarizing the effect of odors from the collection and disposal of refuse is largely relative, depending a good deal upon the environment and in particular upon the industrial odors present. Nuisances should, of course, be avoided. But sentimental objections to garbage works are too often raised through a fear of odors of less intensity than a nuisance, and frequently not noticeable at all.

A rational viewpoint has due regard for the cost of suppressing odors and also emphasizes the advantage of good design and construction in the first place, followed by clean and careful operation.

WOUND AND SKIN DIPHTHERIA AS A PUBLIC HEALTH PROBLEM.

LEVERETT DALE BRISTOL, M. D.,
Professor of Bacteriology, University of North Dakota; Director of the State Public Health Laboratories, University, North Dakota.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December 4, 1914.

MEDICAL men in general, and public health specialists in particular, have come to believe that diphtheria is one of the few diseases which at present are under fairly satisfactory control. The bacillus which causes the disease is easily recognized. The chief modes of transmission are well understood. By the use of anti-toxin we are able to prevent or to cure a large percentage of cases. Even the important problem of disease "carriers" was first worked out in connection with this infection.

In spite of all this it must be apparent to the close student of preventive medicine that there are many cases of diphtheria which develop without any recognized source.

It is the purpose of this paper (1) to call attention to some of these sources, such as wound and skin diphtheria, (2) to explain how they may be prevented, and (3) to demonstrate a satisfactory treatment of wound diphtheria.

Diphtheria may be properly divided into two classes: 1. Faucial, including the ordinary forms of the disease as they occur in the pharynx and larynx. 2. Extrafaucial, including nasal, vaginal, wound and skin diphtheria.

The first class has attracted most of our attention from public health and therapeutic standpoints. Only during recent years have we come to realize the importance of nasal diphtheria in the spread of the disease and we now take bacteriological cultures from the nose as well as from the throat in all routine examinations.

The existence of wound diphtheria has been known for many years, yet very little attention has been drawn to it from the standpoint of Public Health. Interesting cases have been reported by Paterson,[2] Gerloczy,[3] Schwab,[3] Place,[4] Sowade,[5] and others.[1] Many types of skin diphtheria have been described in the literature. These range from simple eczema-like,[8] or vesicular[9] types, to marked gangrene.[7] From the standpoint of dermatology, Knowles and Frescolm[11] have recently described some of these types of skin diphtheria and have called attention to the danger of this form of diphtheria as a source of infection.

It would seem that the wound or skin diphtheria "carrier" is more dangerous than the ordinary faucial "carrier." The bacilli are on the exposed surfaces of the body in the former class of "carriers" and infection by direct contact, or indirect infection through clothing is made more possible. Wound and skin diphtheria are usually of much longer duration than ordinary diphtheria in the throat. Slater,[9] and

Eddowes and Hare[10] have reported cases of three years' duration. Hence, the serious feature of these cases is that most of them go unrecognized as diphtheria for such a long period. What a fruitful source for countless cases of diphtheria! Evidence is not lacking to show that such cases do serve as sources of infection. Richard[8] describes a patient who had an eczema below her left ear in which diphtheria bacilli were found. Following this her sister developed a typical case of diphtheria.

Baum[12] tells of a discharging sinus of the hip-joint in a boy, from which diphtheria bacilli were isolated. The cultures from the throat were negative but later became positive. This case was followed by a small epidemic (about 19 cases) in the orthopedic ward of the hospital where this boy was being cared for. Several of these children had severe clinical diphtheria.

Engman[13] recalls a case in which a child had recovered from a typical throat diphtheria. Following this an aural discharge developed with some skin eruption about the ear, and from the lesion diphtheria bacilli were cultivated. Another child contracted a fatal diphtheria while playing with this patient before the ear and skin conditions were identified as being due to the Klebs-Löffler bacillus.

On the other hand, open wounds and skin lesions should be protected from cases of throat or nasal diphtheria. Jack[6] describes a case in which a mother contracted a skin diphtheria on the site of a trauma above the left elbow, from her child who had nasal diphtheria.

Knowing these facts, is it not apparent that some concerted effort should be made to require bacteriological examination of all skin lesions, and of suspicious or slowly healing wounds, as an important preventive measure?

A positive diagnosis having been made, rigid quarantine should be established, and proper treatment energetically started.

As an illustration of the necessity for routine bacteriological examinations of all suspicious or slowly healing wounds, as well as an example of successful therapy in wound diphtheria, the following case, which was diagnosed in our laboratory, may be of interest.

Mrs. X, 36 years of age, had suffered for several years with intermittent attacks of "dyspepsia" and abdominal pain which were diagnosed as due to gall stones.

On April 11, 1914, the patient was operated upon and one large stone was removed from the neck of the gall-bladder. Her convalescence was quite normal up to April 15, when her temperature suddenly rose to 103.2° and her pulse-rate increased to 122. At this time there were no signs of increased abdominal distention or pain. A small tube was directed into the abdomen along side of the drainage tube in the gall-bladder, and a very little pus escaped. The following day her temperature was 101° and four days later, April 20, was normal, and remained so with the exception of a slight rise of about one degree every other day. During the next two or three weeks the drainage tract became smaller but did not heal normally.

On several occasions the physician and nurse had remarked on the peculiar appearance of the wound and its extreme slowness in healing.

The patient returned to her home in the country, temperature and pulse being normal. The track of the drainage tube had not healed, however.

Her general condition remained very good for one week after her return home, when she became worse. She seemed to lose considerably in strength and became anemic. The track of the drainage tube was still open and looked inflamed, and was very tender and painful.

About July 1 the patient returned to her physician. She was anemic, unable to walk, and the wound of the drainage tube had become much larger, apparently all the tissues down to the muscles having become involved in a sloughing process which covered an area the size of the palm of the hand. The edges and walls of this wound were very hard and tough. The wound was covered by a greenish-brown membrane which was tough and "leathery." It was very difficult to separate this from the underlying tissue, and any such attempt caused a great deal of pain. For a few days the patient complained of "seeing double" and she developed some paralysis of the arms and legs. Urine examinations at this time showed a large amount of albumin and casts.

A few days after her return the attending surgeon took a culture from the wound, on blood serum, and sent it to our laboratory where a diagnosis of diphtheria was made—a large number of Klebs-Löffler bacilli, associated with staphylococci, being present.

The patient was immediately removed to the Detention Hospital and put under strict quarantine. Although the condition had doubtless existed for many weeks, and the patient was suffering from a more or less chronic diphtheria toxemia, the writer advised the giving of anti-toxin. Two thousand units were injected into the walls of the wound cavity. Following this, the patient's general condition seemed to improve, but the wound remained unchanged with no sign of softening or separation of the membrane. Cultures from the wound remained positive for diphtheria bacilli. During the progress of the disease many antiseptics had been used on the wound, including iodine, strong carbolic acid solution and even a strong solution of nitric acid. These had proven ineffectual in destroying the membrane or in killing the Klebs-Löffler bacilli as is evidenced by the positive cultures that were obtained.

"The Treatment of Diphtheria Carriers" is a subject which has received attention from numerous investigators. Albert[15] has made a very careful study of this subject but unfortunately leaves out of consideration extra-faucial "carriers" with the exception that he emphasizes the possibility of diphtheria bacilli being present in the urine of convalescents.

Knowing of the successful work which had been accomplished by the use of sprays of staphylococci[16] and of lactic acid bacilli[14] in throat diphtheria, we advised the use of the latter organism in this case of wound diphtheria.

Because staphylococci were present with the diphtheria bacilli, it was thought useless to attempt any spray treatment with that organism. The question also arose in our minds why the staphylococci, which were present in the wound, had not inhibited the growth of the Klebs-Löffler bacilli if they really had such a specific effect as has been described by Schiotz[16] and others? This finding of abundant staphylococci along with virulent diphtheria bacilli would seem to lend strength to the opinion of Womer[17] that staphylococcus spray does not materially aid in clearing up throat diphtheria.

Staphylococcus spray has even attained some disrepute because of serious results attending its use.[18] For these reasons it was thought advisable to use a nonpathogenic organism.

The first two days of the treatment, a spray was prepared from lactic acid bacilli tablets dissolved in sterile water. After this, broth cultures of lactic acid bacilli from our own laboratory stock cultures were used. These living bacilli were sprayed on several times a day and a sterile dressing applied over the wound. Care was taken that no antiseptics should be used on the wound during this treatment. About three or four days after the treatment was started, the wound began to lose its tough, leathery appearance, the edges became softened and a greenish-brown liquefied material appeared in the wound. In six days more the membrane was fully liquefied, leaving a clean granulating surface, and the wound cavity was closing up quite satisfactorily. Cultures taken on two different occasions proved negative for Klebs-Löffler bacilli. The wound became entirely healed, but the general condition of the patient did not improve so rapidly. Eventually, however, the toxemia disappeared and the patient fully recovered her health and strength.

This result in the treatment of wound diphtheria confirms the work of Wood[14] and Nicholson and Hogan[19] on the inhibiting effect of lactic acid bacilli on diphtheria, and demonstrates the value of lactic acid bacilli sprays in wound diphtheria as well as in throat diphtheria.

Goltz and Brodie[20] conclude that "Lactic acid bacilli hasten the disappearance of diphtheria membrane, but will not produce cultures negative to the bacillus" in cases of throat diphtheria.

In this case of wound diphtheria not only was the membrane rapidly liquefied, but cultures were rendered negative for diphtheria bacilli.

Summary.

1. Because of the failure to recognize wound and skin diphtheria, and because of its exposed nature and long duration, this form of diphtheria is especially dangerous as a source of the disease in general.

2. All open wounds and skin lesions should be carefully guarded against invasion by Klebs-Löffler bacilli.

3. Routine bacteriological cultures should be taken and examinations made for diphtheria bacilli in all cases of suspicious or slowly healing wounds or skin lesions.

4. In the treatment of a case of

wound diphtheria, sprays of living lactic acid bacilli were of great value in causing the rapid liquefaction of the membrane and the prompt disappearance of the Klebs-Löffler bacilli.

In conclusion the writer wishes to thank Dr. Thomas Mulligan for his kind permission to report this case, and for valuable records and information supplied.

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A PROPOSED AMERICAN PUBLIC HEALTH ASSOCIATION COURSE OF STUDY FOR HEALTH OFFICIALS AND OTHERS INTERESTED IN PUBLIC HEALTH WORK.

FREDERIC D. BELL,
New York City.

Read before the General Session of the American Public Health Association, Jacksonville, Fla., December 4, 1915.

THERE has been for many years a feeling among some members of this Association that its opportunities for usefulness, not only to its own members, but, to a large extent, to the communities from which its membership is recruited, were not fully realized and developed. An annual meeting, with a concentrated pabulum of scientific knowledge and experience, spread out later in small monthly courses in the JOURNAL, is very good so far as it goes, but it certainly is not utilizing to the greatest advantage the organization which has been built up. It is not the purpose of this paper to point out all the lines of usefulness which could be developed by this Association. They are undoubtedly many, and some of these have been pointed out by others and more may develop in the course of this meeting. It is my purpose simply to make a suggestion for one line of activity, which I am prompted to do from having observed a similar line of activity in another organization with which I have been privileged to be associated. In April of 1913, the suggestion I am about to make was taken up with one of the officers of this Association with a view to presenting it at the Colorado meeting. The idea was favored, but other things crowded in and prevented the writing of the paper in time for that meeting. Early this fall the suggestion was made to the secretary of this organization, who also approved of it, and this paper is the result, therefore, of that correspondence. These facts are mentioned simply to indicate that the idea antedated some other suggestions of like character which have been made this year, and free me of any charge of plagiarism.

There is in the United States an organization known as the Associated Advertising Clubs of America, which has been in existence for some ten or twelve years and which numbers in its membership some ten thousand or more individuals, represented by some one hundred and thirty-five clubs in various parts of the United States and Canada. This organization, like our own, has an annual meeting at which many papers are read, later to be printed—usually in abstract form—in the journal of that association. But this association of advertising men has not been satisfied to let its work rest with an annual meeting and the publication of a journal. Some years ago it felt there should be some work of benefit to its membership carried

on through the year, which would keep the interest in the organization stimulated. Two important phases of work in which advertising men are interested were started by the appointment of appropriate committees, respectively known as the Vigilance Committee and the Educational Committee. These committees represent movements that are being carried out in the local clubs by similar committees. The work of the Vigilance Committee, with which this paper is not particularly concerned, may be summed up, briefly, as a censorship over advertising to prevent the publication of false and misleading statements in advertising, or the advertising of products in themselves fraudulent or harmful. Some time it might be worth while for this Association to interest itself in the work of the Vigilance Committee of the Associated Advertising Clubs of America or with the work of the vigilance committees of local advertising clubs in the cities scattered over the United States and Canada. The possibilities of using this powerful organization for the elimination of fraudulent patent remedies and quackery generally, should be a matter that would interest public health men.

It is the work of the Educational Committee, however, that appeals to the writer at the present time as a possible line of work for this Association. Briefly, the purpose of the Educational Committee of the Associated Advertising Clubs of America—which is generally spoken of as the National Educational Committee in contra-distinction to the educational committees of the local advertising clubs—is to promulgate courses of study in the various phases of advertising work, that in turn will be taken up by the clubs or the individuals in the clubs and studied with a view to perfecting the members in the principles and practices of advertising. An educational committee in this Association would have similar purposes in the public health field, but would have to work with the individuals directly, as of course there are no such things as public health clubs.

It is well understood, I think, that the great majority of the men in public health work enter it untrained. There used to be a feeling that the position of health officer or health commissioner of a community must be held by a physician as he was supposed to be the only person who understood health problems. The members of this Association, however, pretty generally recognize that a certificate granting the degree of doctor of medicine to the individual therein named does not, of necessity, qualify such a person for the position of health officer. In many small communities men have been forced into the position of being responsibile for the public health simply because of their knowledge of medicine and because no other physician has been available or willing to take the place. Many of these men are conscientious, anxious to do what is right, and to administer the office with a view to prevention of disease and the general up-building of the health of the community. When problems are brought to them, or problems which, through emergency, have to be solved at once, they are

at a loss to know what to do or what the general practice is in the combating of the difficulties in which they find themselves. Many of these men would undoubtedly be glad to have an opportunity to study the methods and practices of those who have had larger and more extended experience in this field of work, and to be able, when emergencies arise, to turn to a compilation of these methods and practices which have been tried and which have more or less been proven in the crucible of necessity. To a certain extent this Association has already made a start along this line. The work of the standard committees for various laboratory methods and practices has established itself as authoritative throughout this continent. It is the purpose of this paper to suggest that this work be extended so that the entire field of public health practice be covered, and that standards of practical methods of dealing with all the phases of public health work which are likely to arise in any community be established and promulgated so that those interested in public health work, either as officials or otherwise, could always turn to this Association for authoritative advice and direction in the handling of such problems.

How best to accomplish this purpose should undoubtedly be left to the combined wisdom and experience of a committee of this Association. Possibly, however, it could be worked out somewhat on the lines of the Educational Committee already referred to, appointed by the Associated Advertising Clubs of America. This committee works through nine sub-committees, the names and functions of which are, as the writer understands them, briefly as follows:

1. Committee on Publications.—This committee is charged with the duty of publishing the lectures, text-books, and such other educational matter as is written directly for the use of the Educational Committee or designed for part of its campaign.

2. Committee on Study Courses.—This committee is charged with the preparation of the lectures, the courses of study, and similar work.

3. Committee on Small Town Club Work.—On this committee devolves the work of stimulating the local clubs in small towns to take the educational courses and to do educational work. In some of these clubs they have local educational committees and the work is carried on through the chairman of the local committee.

4. Committee on Schools and Y. M. C. A.'s.—This committee is charged with the responsibility of having schools and the educational departments in Y. M. C. A.'s offer courses in the study of various phases of advertising, sometimes using the lectures prepared by the National Educational Committee and sometimes calling on local talent to give courses of lectures. In most of the large cities in the United States the Y. M. C. A.'s have heartily coöperated in this work and most of those having educational departments have courses in advertising. Many schools are becoming interested, particularly those that have a leaning towards preparation for commercial work.

5. Committee on Libraries.—This

committee is designed to see that public libraries throughout the country procure such standard books on advertising rules and practices as will enable a student to procure suitable reading matter in addition to the lectures which he will get through the regular courses of study promulgated by the Educational Committee. It is also intended to stimulate local clubs, where they are of sufficient size and maintain their own clubhouses, to establish such reference libraries. In the city of Newark, New Jersey, there has been established a Business Men's branch of the Public Library, which, I understand, is the first departure of this kind in this country.

6. Committee on Research.—This committee makes a study of business conditions, studies the types of advertising that are successful and determines why they are successful, and the types of advertising that failed and why they failed. This is all very valuable information to the progressive advertising man and undoubtedly enables many to steer away from dangerous and unprofitable practices.

7. Committee on Lectures.—In addition to the regular course of study, there are general lectures prepared, illustrated, many times, with lantern slides, which are sent out to the various clubs to be delivered by some local member before the entire club membership. This committee is charged with the preparation of these lectures and with their distribution to the local clubs.

8. Committee on Colleges and Universities.—This committee is similar in many respects to the Committee on Schools and Y. M. C. A.'s, excepting that it devotes its energies to the higher institutions of learning.

9. Committee on Educating the Public.—This is a new departure in the work of the Educational Committee and its work is not developed to the extent of being able to say definitely how the committee proceeds in its education of the public.

It will be obvious that committees similar to many of those above named could be utilized in the work of an education committee of the American Public Health Association. The work would be, of course, somewhat different and some of the committees would not be necessary. The naming of them here is not intended as a suggested form of organization for any committee that may be appointed by this Association, but simply as indicating the organization of a committee doing successful work in another large association and for such assistance as that may give to the committee charged with the organization of educational work in this Association. Of course it is impossible to go into the detailed work of these various committees in the scope of this paper.

It is obvious, I think, that the preparation of courses of study indicating the best practice in the various lines of public health work would presently become very valuable as a work of reference. It has seemed to the writer that as such courses of study are completed, they could be compiled in book form and issued as works of reference and become a revenue-producing asset of the Association, as have the reports of the Standard Committees

on Water Analysis, Milk Analysis, etc. It is also obvious, I think, that it would be an extremely valuable thing to have a committee, which might correspond to the Committee on Libraries of the Advertising Association, compile a bibliography of works on public health problems, segregated under the various phases of public health work, which would be of very great value indeed to students of public health problems or to those in public health practice.

In the September 4, 1914, issue of *Public Health Reports* is an article by Assistant Surgeon-General John W. Trask, of the United States Public Health Service, suggesting very much the same idea as it is the purpose of this paper to suggest. The fundamental difference is that he proposes that this work be carried on by the secretaries of the state boards of health. If the suggestion were taken up by the executive officers of the state and provincial boards of health in each of the several states in this country and of the other countries interested in this Association, there would be as many different methods of dealing with the problems suggested as there are numbers of states or provinces. If, on the other hand, this work could be carried on by a committee of this Association, composed, possibly, to a large extent of the secretaries of state or provincial boards of health, a more or less uniform practice could be suggested for the entire territory represented in this Association and a wasteful duplication of effort avoided. The committee, no doubt, could in this way avail itself of the experts of the various state and provincial boards of health, and there is probably little reason to doubt that the federal governments would be glad to coöperate in this work by authorizing their experts to coöperate with this committee.

There is, as the members of this Association know, a growing amount of attention being paid to the subject of educating men for public health work in many of our large universities. This is very commendable and needs our encouragement. The educational work suggested by this paper is not intended to conflict or compete with the very excellent work these institutions are doing, but to supplement it by providing the fundamentals of the science to those not trained in universities and by giving the results of practical experience to those who have had the training.

Neither is it intended that the suggested committee take up, for the present at least, any educational work for the general public. Some very excellent work of this character is being done by health departments in our large cities and by some state departments. No doubt such work could be profitably done at some future time by some committee of this Association.

The writer hopes that this suggestion contains the germ of an idea which will commend itself to the approval of this Association.

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DISEASE AND DISASTER.

The feeling of apathy with which the public regards the thousands of deaths that annually occur as a result of preventable disease, contrasted with the excited comment which is indulged in when some catastrophe of an unusual and somewhat spectacular character obliterates a number of lives in a moment, is the subject of the following timely statement in a recent bulletin of the Cincinnati Health Department.

"In the storm that struck this city last week, one family lost five, and another six of its members. The city was appalled at these tragedies, and for years to come many citizens will view with apprehension every sign of an approaching storm.

"The high wind, darkness, rainfall, lightning, thunder and falling buildings formed a stage setting that lacked nothing in its appeal to man's feelings of terror and utter helplessness.

"The knowledge that beneath the ruins lay the bodies of helpless men, women and little children aroused a feeling of infinite pity and spurred to titanic efforts those engaged in the work of rescue.

"The ten hearses carrying the bodies to the church and then to the cemetery furnished a picture that will never fade from the memories of those who saw it, its appeal to the imagination being tremendous and overpowering.

"During every week of the year an average of sixteen deaths occur in other scattered portions of the city. These are due to disease that is preventable. Their occurrence causes no great wave of sympathy to sweep over the municipality and calls for but a brief line in the daily press in the way of comment. Many of them represent years of suffering, and, if full histories could be obtained, would doubtlessly reveal tragedies so gruesome that the storm's toll, by comparison, would almost seem like an act of mercy."

The Chicago excursion steamer disaster, because of the larger number of victims, is a more striking illustration of the same point. In the Chicago case the deaths of the people who were on the steamer *Eastland* might have been prevented, yet many people who are horrified and even stunned by this accident, would calmly read the vital statistics for the city of Chicago without giving a second thought to the infant mortality or the tuberculosis death-rate or the number of persons who annually succumb to cancer.

The health department and a small number of citizens are left to fight the horror of preventable death from disease, but, when an accident simultaneously brings grief to a few score homes, the whole city, even the whole country, is stirred to an expression of grief and indignation.

This is the darker side — there are, however, many instances that bring joy and encouragement to the small army that is fighting for the things that mean a healthier race and a happier one. Tuberculosis is not gaining on us, infant mortality and the general death-rate are being reduced, typhoid fever, if we compare the present situation with its prevalence some years ago, is greatly diminished and a pandemic like those that visited Europe in the Middle Ages has surely become an impossibility in the United States.

ACCIDENTS FOLLOWING VACCINATION.

W. F. Elgin,
Glenolden, Pa.

Read before the General Sessions, American Public Health Association, Jacksonville, Fla., December 4, 1914.

THIS study is suggested because of the increasing difficulty in securing compliance with school requirements in reference to vaccination, due to the activity of anti-vaccinationists in exaggerating both the number and character of these unfortunate accidents.

Cancer, consumption, typhoid fever, ulcerated stomach, leprosy, diphtheria, syphilis and many other diseases have been charged to vaccination, but these require no discussion here. Several cases of cerebro-spinal meningitis have been reported as following vaccination, but here again no causal relation has been established. Septicemia in various forms, due to invasion of pathogenic organisms at some stage of the vaccinal process from accident or carelessness is occasionally noted.

Recently a Philadelphia court awarded a negro $5,000 damages for the loss of a leg, said to be due to septicemia, following vaccination by a city physician in 1910. Carelessness was alleged. The verdict, however, has been set aside by a higher court.

A case is now pending in Chestertown, Md., where the commissioners are sued for $10,000 for the death of a negro child through alleged carelessness in vaccination by the county physician.

Recently, three cases of anterior poliomyelitis following vaccination in from ten to twenty days, have been reported from New York State. So far as is known, these children did not come in contact with each other or with other cases of poliomyeltis, so that the parents naturally concluded that vaccination was at least a factor in some way.

While cases of the classes enumerated are a drawback to enforcing vaccination, they are insignificant as compared with tetanus, and it is in a study of this disease in its relation to vaccination that we are chiefly interested.

I have been able to secure more or less complete histories of 82 cases occurring in the United States and Canada since 1899. Some of these, prior to 1902, were discussed by Wilson,* and are taken from his paper; some more recent Philadelphia cases are taken from Wadsworth's† report of coroner's cases and from records of the coroner's court. I wish here to express to Doctor Wadsworth my appreciation of his assistance in securing copies of these records.

First analyzing these somewhat in detail we note the following facts.

Case 1. Pushed against door by playmate at school. Scab torn off. Tetanus developed in 24 hours.

Case 2. Large, deep ulcer present 20 days after vaccination. Arm dirty.

*An analysis of fifty-two cases of tetanus following vaccination with reference to source of infection. Journal of A. M. A., 5/3/02.

†Records of cases of tetanus in Philadelphia during recent years by Dr. Wm. S. Wadsworth. From the Transactions of the College of Physicans of Philadelphia, 1913.

Case 3. Dirty, sloughing ulcer. Child in poor health.

Case 4. Deep ulcer present.

Case 5. Sore about $1\frac{1}{2}$ inches in diameter filled with pus; partly covered with a dirty bandage.

Case 7. Deep ulcer present.

Case 8. Dressed at time of vaccination with cotton wadding from an old quilt. Scab knocked off.

Case 9. Scab torn off arm; sleeve and arm both dirty at time tetanus developed.

Case 10. Large ulcer present. Arm and sleeve filthy.

Case 13. Bad, sloughing sore.

Case 14. Large suppurating ulcer, exposed to clothing and atmosphere.

Case 15. Deep ulcer in the arm, covered with á greenish matter.

Case 16. Large suppurating ulcer, which the doctor believes was infected by the finger nails of the child scratching it.

Case 17. Dressed by mother; dirty dressing retained for days. *Recovery.*

Case 18. Child wore shield and "dirt got under it."

Case 19. Shield left in place for over three weeks; large, deep, ulcer present; dressed with flaxseed poultice and rag bandage.

Case 20. Large ulcer; scab removed and dressed at home. Child assisted in taking up potted plants. Cultures from earth near her home showed tetanus bacilli.

Case 22. Scab torn off; ulcer dressed at home; tetanus organisms in soil near child's residence.

Case 23. Celluloid shield fastened with adhesive strips; not removed for 28 days. Child slept with father who had charge of the horses in the stable on floor below.

Case 24. Shield not removed for 21 days. Filled with discharge.

Case 25. Child's father was coachman and had charge of horses in stable on floor below. Child slept with father; vaccinated on the leg; ulcer size of a quarter.

Case 26. Bunion plaster used as shield.

Case 27. Dressed by mother; dirty dressing retained for days. *Recovery.*

Case 28. Bunion plaster applied when vaccinated.

Case 29. Muslin shield used; had not been removed and pus was escaping from shield.

Case 30. Child attended masquerade with wound exposed to red calico domino.

Case 31. Severe ulcer. Threw bandages on ground and then replaced them on the arm.

Case 32. Linen shield was used; had not been removed when tetanus set in.

Case 33. Muslin shield was used; ulcer about the size of a half dollar; later no covering used; lint from shirt ulcerated into wound.

Case 34. Ulcer about 1 x $\frac{3}{4}$ of an inch.

Case 35. Shield was removed in one week; ulcer about the size of a quarter.

Case 36. Vaccinated by a druggist.

Case 37. Surface to be vaccinated not washed; child played in lumber yard near horses.

Case 39. Patient frequently at work shoveling the dirt in yard. Dirt rich in tetanus bacilli; scratched with finger nails.

Case 40. Shield not removed for 22

days; filled with excretion which was running down the child's arm.

Case 41. Arm poulticed with plantain leaves, then with cow manure.

Case 42. Shield was filled with pus without changing for days; scab lost on 22d day and rag worn from that time.

Case 43. Vaccinated by policeman; severe ulcer; rag dressing; unclean surroundings.

Cases 45–6–7–8. Insane patients in the Philadelphia Hospital; filthy habits.

Case 49. Deep ulcer.

Case 53. Improperly cared for arm.

Case 54. Vaccinated on farm where a horse, cow and calf had previously died of tetanus.

Case 55. Played in yard; wound opened twice by falls.

Case 56. Physician's child; father believes case of secondary infection.

Case 59. Scab knocked off in school yard; onset of tetanus eight days later.

Case 60. A blow on arm October 4th; tetanus developed, followed by death on October 9th.

Case 62. Vaccine wound infected by scratching.

Case 65. Played about stable.

Case 71. Infected on farm.

Case 73. Sores on finger and ear.

Case 74. Subsequently ran splinter in the hand, which later became infected.

Case 75. Dressed with lettuce leaves once or twice daily.

Case 77. Blow received on the arm ten days after vaccination.

Case 78. Underclothing stuck to the sore.

Thus we note that out of 82 cases, we have histories of 54 showing possibilities of subsequent infection of the vaccination wound; such as an improperly used shield, dirty dressings, traumatism, etc.; and a more or less intimate association with stables in several instances.

A further investigation shows that the disease was much longer in developing after vaccination than the usual incubation period of tetanus.

Developing within one week, 2.... $2\frac{1}{2}$ per cent.
Developing in from one to two weeks, 4..... $4\frac{3}{4}$ per cent.
Developing in from two to three weeks, 34 $41\frac{1}{2}$ per cent.
Developing in from three to four weeks, 17 $20\frac{3}{4}$ per cent.
Developing in over four weeks, 6.. $7\frac{1}{4}$ per cent.

All but four of these cases resulted in death; whereas in the 200 cases of tetanus reported by Andrews and Morgan in which the incubation period was fourteen days or over, 77 died; a mortality of only $38\frac{1}{2}$ per cent. This would indicate that the infection was subsequent to vaccination. A further inspection of our list shows that of the 47 cases in which we have been able to obtain the number of days from the onset of tetanus to death, we find that 24, or slightly over 50 per cent. died in 48 hours, while 42, or something over 95 per cent. died within seven days.

Andrews and Morgan* in their table of 252 cases originally investigated show only 27 cases with an incubation period of over 14 days and of this number 19, or something over 70 per cent. recovered; while the average period between onset and death of the remaining eight was $6\frac{1}{8}$ days.

* Tetanus. A preliminary report of a statistical study by James M. Andrews, M. D., LL. D., and Arthur C. Morgan, M. D., Philadelphia, Pa., Journal A. M. A. July 29, 1905.

CHART 1.

	Location.	Date of vaccination.	Date of onset of tetanus.	No. of days between vaccination and onset.	Date of death.	No. of days between onset and death.	Reported by
1.	Columbus, Ohio	1899		3 wk.			
2.	Cleveland, Ohio	1/3/99	1/24	21 da.	1/26	2	
3.	Omaha, Nebraska	1899			2/11		
4.	Brewster, N. Y.	Oct. '99		21 da.			Wilson
5.	Chicago, Ill.	10/3/99	10/16	13 da.	10/30	14	
6.	St. Louis, Mo.				12/23		
7.	St. Louis, Mo.	1900			10/8		
8.	Paris, Tenn.	11/27/00		3 wk.	Death		Wilson
9.	Kalamazoo, Mich.	1/3/01	1/27	24 da.	2/1	5	Wilson
10.	Cleveland, Ohio	1/3/01	1/24	21 da.	1/26	2	
11.	Chester, Pa.	5/25/01			7/1		
12.	Cleveland, Ohio	5/25/01	6/15	21 da.	6/19	4	
13.	Cleveland, Ohio	6/5/01	6/25	20 da.	7/4	19	
14.	Philadelphia, Pa.	6/7/01	6/27	20 da.	6/29	1½	Wilson
15.	Cleveland, Ohio	6/16/01	7/15	29 da.	7/20	5	
16.	Philadelphia, Pa.	9/5/01	9/19	14 da.	9/24	5	
17.	Massachusetts	9/10/01	9/10	21 da.	*Recov.*		Wilson
18.	Spring City, Pa.				9/19		
19.	Camden, N. J.	10/1/01		7 wk.		7	Wilson
20.	Burlington, Vt.	10/2/01	10/21	19 da.	Death	2	Wilson
21.	Camden, N. J.	Fall '01					Wilson
22.	Burlington, Vt.	Oct. '01		21 da.	Death		Wilson
23.	Philadelphia, Pa.	10/9/01	11/6	28 da.	11/8	1½	Wilson
24.	Camden, N. J.	10/14/01	11/8	25 da.	11/15	7	Wilson
25.	Philadelphia, Pa.	10/14/01	11/4	21 da.	11/8	4	
26.	Camden, N. J.	10/15/01?	11/1	17 da.			
27.	Atlantic City, N. J.	10/18/01	11/8	21 da.			
28.	Camden, N. J.	10/19/01	11/4	16 da.			
29.	Camden, N. J.	10/19/01	11/6	18 da.	11/8	2	
30.	Philadelphia, Pa.	10/19/01	11/10	22 da.	12/1	9	Wilson
31.	Bristol, Pa.	10/19/01	11/10	22 da.	11/12	2	Wilson
32.	Camden, N. J.	10/21/01	11/11	21 da.	11/14	3	
33.	Camden, N. J.	10/23/01?	11/11	19 da.	11/13	2	
34.	Atlantic City, N. J.	10/23/01	11/13	21 da.			
35.	Camden, N. J.	10/25/01?	11/15	21 da.			
36.	Nova Scotia, Can.	10/25/01	11/18	24 da.			
37.	Philadelphia, Pa.	10/26/01	11/13	18 da.	*Recov.*		Wilson
38.	Camden, N. J.	10/26/01					
39.	Philadelphia, Pa.	10/27/01	11/11	16 da.	11/21	5	Wilson
40.	Atlantic City, N. J.	10/28/01	11/16	19 da.			

CHART 1.—*Continued.*

	Location.	Date of vaccination.	Date of onset of tetanus.	No. of days between vaccination and onset.	Date of death.	No. of days between onset and death.	Reported by.
41.	Merchantville, N. J.	10/28/01					
42.	Bristol, Pa.	11/3/01	11/24	21 da.	11/27	3	Wilson
43.	Brighton, N. J.	11/4/01	11/27	23 da.	12/2	5	Wilson
44.	Camden, N. J.	11/4/01	11/25	21 da.	11/27	1½	Wilson
45.	Philadelphia, Pa.	11/8/01	11/27	19 da.	11/30	3	Hughes
46.	Philadelphia, Pa.	11/11/01	12/1	23 da.	12/16	15	Hughes
47.	Philadelphia, Pa.	11/18/01	11/25	7 da.	11/26	1	Hughes
48.	Philadelphia, Pa.	12/9/01	12/30	21 da.	*Recov.*		
49.	Montreal, Canada	9/7/06	9/26	19 da.			
50.	San Francisco, Cal.	7/27/09	8/21	25 da.	8/26	1	
51.	Philadelphia, Pa.	8/20/09	9/17	28 da.	9/19	2	Wadsworth
52.	Bethlehem, Pa.	8/28/09?	10/14	47 da.	10/15	1	
53.	Hartford, Conn.	10/2/09	10/23	21 da.	10/25	2	
54.	W. Summerville, Mass.	1909			10/22		
55.	Philadelphia, Pa.	9/6/09	9/13	37 da.	9/15	2	Wadsworth
56.	Philadelphia, Pa.	9/9/09	10/5	26 da.	10/10	5	Wadsworth
57.	Lancaster, Pa.	8/7/10			10/23		Dr. Miller
58.	Lancaster, Pa.	8/24/10			10/9		Dr. Miller
59.	Philadelphia, Pa.	9/7/10	10/1	24 da.	10/5	4	Wadsworth
60.	St. Louis, Mo.	9/20/10			10/9		
61.	Philadelphia, Pa.	9/21/10	10/13	22 da.	10/16	3	Wadsworth
62.	St. Louis, Mo.	10/4/10	10/16	12 da.	10/17	1	
63.	St. Louis, Mo.	10/25/10					
64.	Philadelphia, Pa.	10/26/10	11/13	18 da.	11/15	2	Wadsworth
65.	Philadelphia, Pa.	11/5/10			12/4		Wadsworth
66.	Worrell Park, Md.	1911					
67.	Mt. Winans, Md.	1911					
68.	York Road, Md.	1911					
69.	Annapolis, Md.	1911			10/2		
70.	Philadelphia, Pa.	8/5/11	10/12	58 da.	10/14	2	Wadsworth
71.	Philadelphia, Pa.	8/28/11	9/22	25 da.	9/24	2	Wadsworth
72.	Philadelphia, Pa.	9/5/11			9/20		Wadsworth
73.	Philadelphia, Pa.	7/17/12	8/17	31 da.	8/21	4	Wadsworth
74.	Philadelphia, Pa.	9/1/12	9/16	15 da.	9/17	1	Wadsworth
75.	Philadelphia, Pa.	5/2/13	5/21	19 da.	5/22	1	Wadsworth
76.	Philadelphia, Pa.	5/14/13	6/2	19 da.	6/3	1	Wadsworth
77.	Philadelphia, Pa.	9/2/13	9/22	20 da.	9/24	2	Wadsworth
78.	Philadelphia, Pa.	9/8/13	9/22	14 da.	9/24	2	Wadsworth
79.	Gloversville, N. Y.	7/26/14	8/24	29 da.	8/27	3	
80.	Gloversville, N. Y.	8/11/14	9/6	26 da.	9/11	5	
81.	White Plain, N. J.	8/17/14	9/14	28 da.	*Recov.*		
82.	Aurora, N. Y.	8/24/14	9/9	16 da.	9/18	9	

This again would indicate infection subsequent to the vaccination.

The geographical distribution of these cases seems worthy of consideration. Of the 82 cases, 34 are from Pennsylvania, 16 from New Jersey, 6 from Ohio and 5 from New York; with the balance, 21, scattered over 9 other states and Canada. This in a measure conforms to a list of Andrews and Morgan of 1,099 cases of tetanus from all causes; Pennsylvania leading with 224 cases and the four states of Pennsylvania, Ohio, New York and New Jersey contributing 515 or nearly one half the total number reported by them in the United States.

Some critics have suggested that if tetanus following vaccination is simply a secondary infection, why are not more cases of tetanus reported as resulting from open wounds present at all times in large cities. In order to show that this disease does occur in localities where tetanus is known to be present in the dust, I will call attention to Doctor Wadsworth's article taken from the coroner's records of Philadelphia as follows:

1909

Total virus distributed by health department	40,400
Total cases of tetanus investigated	25
Post vaccinal	3

1910

Total virus distributed by health department	65,000
Total cases of tetanus reported	30
Post vaccinal	4

1911

Total virus distributed by health department	44,183
Total cases of tetanus reported	24
Post vaccinal	3

1912

Total virus distributed by health department	40,844
Total cases of tetanus reported	4
Post vaccinal	2

In these four years, the city distributed 190,427 vaccinations and Doctor Wadsworth estimates that private firms sold at least double this amount, making more than half a million vaccinations in the city. Tetanus followed in only 13 cases, while there were 90 cases of tetanus having no relation to vaccination. This would seem to demonstrate that certainly most cases of post-vaccinal tetanus can be accounted for in the same way as tetanus following any other wound presenting proper conditions for the reception and development of tetanus spores.

I will not take up your time in discussing the possibility of contaminated virus but will only call attention to the fact that if it were possible for tetanus bacilli to escape detection when the virus is subjected to the rigid tests required by the Public Health Service, Doctor Francis'* recent work seems to indicate that the number of organisms must be so few that no harm could result. This is in line with Carini's† earlier work in which he detected tetanus bacilli five times in 400 experiments with 50 difficult lymphs. He states: "The presence of so small a number of tetanus germs forms no particular danger." and that "Some of the particular specimens of lymph in which we could demonstrate tetanus spores were used in thousands of inoculations without any complications resulting therefrom, whatever. Experi-

* Hygienic Laboratory.—Bulletin No. 95.

† Doctor Carini, formerly Chief of Vaccine Department, Bourne, Switzerland.

mentally it is only when the organism is present in numbers so large that they could be easily detected by cultural tests that we may fear the development of tetanus through contaminated virus."

I have thus far attempted to show that in the majority of post-vaccinal tetanus cases the evidence indicated late infection. But admitting this to be true, what can be done in the way of prevention? I would give the following suggestions:

1. The proper cleansing of the operation field.

2. Make proper scarification; short linear incision according to Dock's* method.

3. Instruction of the patient or parents as to after treatment. The vaccinator to examine the vaccination weekly or more often if necessary until the patient is well.

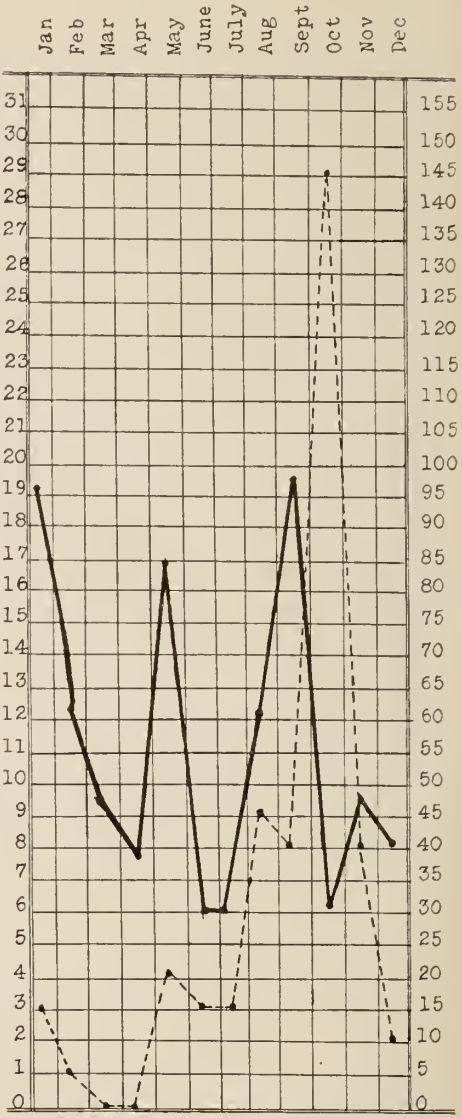
4. On evidence of infection of any kind, treat *promptly* as an infected wound, without regard to the vaccination.

5. Instruct the patient or parents as to the possibilities from neglect of these instructions.

6. Vaccinate only in the winter or spring unless smallpox is present. The emphasizing of this point is the most important object of this study.

In 77 of these cases, the date of onset of tetanus is known, and of this number, 29 developed tetanus in October, 15 in September, 10 in August and 8 in November. The other eight months of the year show a total of 15 cases with none in March or April.

CASES FROM POST-VACCINAL TETANUS COMPARED WITH OUTPUT OF VIRUS.



The black line indicates the average output of virus for the month.

The dotted line indicates the number of cases of post-vaccinal tetanus cases during the same month.

*George Dock A. M., M. D. Simple incisions for vaccinations. Therapeutic notes, Nov., 1906.

To summarize, therefore, over 80 per cent. of these cases occurred in the late summer and the three fall months. You would probably expect this because of the school vaccinations at this time, considering that this would represent the largest total vaccinations in the year. This, however is not the case. For 15 years, I have noted the output of vaccine from the laboratory is usually heavier in the winter than during the school vaccination period. A reference to the chart shows the number of cases of tetanus by months as compared with the output of virus for corresponding periods during the years 1912–1913–1914.

It will be noted that a large proportion of the tetanus cases develop in the fall, while large amounts of virus are also distributed in winter and spring with small case rate for tetanus. Does this not indicate that weather conditions, dust, etc., are more favorable to the development of tetanus in the summer and fall than at other times?

In conclusion, therefore, I cannot too strongly recommend that health officers and others responsible for the vaccination of school children insist on a change in the time when this operation is performed, as a routine procedure.

Résumé.

1. Tetanus is the most important complication of vaccination.

2. The evidence indicates that infection is, in a large majority of cases, post vaccinal.

3. It may be largely prevented (1) by proper care of the vaccinal wound and (2) by requiring certificates of vaccination from school children in the winter or spring rather than in the fall as at present.

THE PROTECTION AND MAINTENANCE OF THE PUBLIC HEALTH DURING AND SUBSEQUENT TO A GREAT CONFLAGRATION.

WILLIAM C. HANSON, M. D.,
State Department of Health, Boston, Mass.

Read before the General Session of The American Public Health Association, Jacksonville, Fla., Dec. 4, 1914.

DURING the night of June 25, 1914, several thousand people in Salem, a sea-coast city of Massachusetts were made homeless by a fire. The burned area included a large manufacturing community. The entire burned area covered a mile in length from west to east and a varying width from a few hundred feet to more than half a mile. The population previous to the fire was about 40,000.

On the day following the fire, the city was placed under martial law.

On the morning of this day the Governor of the Commonwealth handed to me the following document:

TO WHOM IT MAY CONCERN:

This is to certify that William C. Hanson, M. D. has been instructed by me to represent the Massachusetts Board of Health at Salem, and I desire full authority to be given him to go to any section of the city and to do any work that he may deem necessary to safeguard the public health of the city of Salem.

[Signed] DAVID I. WALSH. *Governor.*

This made it mandatory for the public health authorities to work with, not against, the military forces. The first step in importance, therefore, was to find out immediately the most effective way of assisting the militia.

The State Board of Health had made preparations for the emergency. On the night of the fire we realized that a portion of our force would be called upon to assist the militia to maintain the health of the fire-stricken community. There must be a pure water supply and a system of sewerage, not only for the military camps but for the refugees. Then, too, special precautions must be taken as to the protection of food supplies and a careful watch made over the prevalence of communicable diseases.

Methods of action were clearly mapped out and members of our health district officials were in readiness to pull together in such ways as might appear desirable.

There was no stir or commotion on our part, but a definite preparedness of action. In the course of usual activities, we had developed well-defined methods of sanitation, and all that was needed was to put these methods into immediate effect, although, to be sure, under more or less trying conditions.

The State Board of Health, therefore, recognized the fact that the entire sanitary problem must be dealt with by two big forces, (1) a body of military surgeons, working under strict military discipline, and (2) a corps of officials trained in municipal and state health work.

In other words, the problem was a double one—of military and civilian sanitation.

The one big leader or general, at the time of a great fire, is obviously the governor of the state, the commander-in-chief of the army. As would be expected, he looked upon the adjutant-general of the militia and some responsible official of the State Board of Health to get together and join their forces. The governor, therefore, summoned us in consultation. This constituted the first official step taken.

Whether in military or civilian sanitation, discipline is an essential requisite for success. Discipline among our health officials had long since become second nature to them. They had been accustomed to teamwork. To pull together, therefore, in the interest of so great a cause as that of maintaining the health of this fire-stricken community did not seem to them a duty, but a pleasure.

Our officials knew that not only must the health of the civilians be protected, but that of the troops, in order that the troops might be kept in the best condition for their work and not spread disease to the civilians.

Thus the problem became less difficult because there was but one aim in view—to cause the maintenance of the health of both troops and civilians.

The best way of maintaining the health of the troops and civilians was by means of military discipline, and, as the city was placed under martial law, it was the only way.

The first requisite, therefore, at the time of a great conflagration, is military discipline and efficiency in health work.

The highest standard of military discipline and efficiency can be attained only through the joined forces of military and civilian officials under the command of one responsible and efficient head in charge of each force, both of whom are directly responsible to the commander-in-chief of the militia—the governor of the state.

So thoroughly in harmony did the officials of the State Board of Health and the militia act that no time was lost in discussion. Important and effective results were attained through prompt decisions and a keen appreciation of each other's viewpoints, training and position.

The experiences resulting from such harmonious action between the military and civilian health officials lead me to suggest that public health officials not now familiar with the military training and discipline of the state militia in camp sanitation, lose no time in acquiring such practical knowledge. I believe it to be a fundamental necessity for the most effective protection and maintenance of the public health during and subsequent to a great conflagration.

You perhaps noted the word "maintenance" in the title of my paper "The Protection and Maintenance of the Public Health During and Subsequent To A Great Conflagration." It is indeed not enough at the time of a great conflagration to cope with unusual and atypical conditions tending to break down the health of the community; the every-day problems must be dealt with. If anything, exceptional pains should be taken to observe the commonplace, or seemingly trivial, objectionable conditions, in

order to remedy them promptly before any such assumes larger proportions and becomes associated with an outbreak of disease. To act as if the common sanitary standard of maintaining health in a community will answer the purpose of the stricken community is to fail to grasp the situation with all its dangers. Too strict sanitation is scarcely possible. The city must have a thorough cleaning and must be kept clean until living conditions again become normal. Moreover, the highest practicable standard of civilian sanitation is in keeping with the military standard.

The second requisite, then, at the time of a great conflagration, is a common high standard of sanitary efficiency for both troops and civilians.

In one of the military camps, where about 2,000 people were under canvas, there were on duty three medical officers, two medical sergeants, fifteen enlisted men of the medical corps and from eighteen to twenty civilian helpers, who had direct charge of the medical and sanitary work. In addition to these officers, two companies of the militia furnished the necessary guards for the company's streets, hospital, kitchens, latrines, and grounds. Each medical officer had two orderlies in constant attention while he circulated about the camp all day long, making the refugees keep the tents in order and use the latrines instead of their own tents. The other enlisted men either with or without a non-commissioned officer, had charge of the civilian helpers and of the policing of the grounds. The people were quickly trained to keep their tents in proper order. One man, who refused to keep his tent in order, was arrested by the guard on duty, who, in turn, sent for a civilian policeman, with the result that the man served thirty days in jail.

Outside the tents equally good sanitation was demanded. The city was divided into several sections with a medical officer of health at the head of each section. This official was held responsible for a careful sanitary inspection of his territory. The information thus gained was used at once, and effectively. In this work the state and local health officials coöperated in their usual manner, but to an exceptional degree of efficiency. House to house inspections were made to detect cases of communicable diseases, bad housing conditions and possible sources of illness. Extraordinary efforts were made to cover all exposed human excreta and other sources of fly-breeding material.

In order to prevent the occurrence of typhoid fever and disentery, a vigorous anti-fly campaign was instituted. We emphasized the need of screening all foodstuffs and of placing fly traps in the homes, bakeries, stables, restaurants, or any places were food was kept or sold.

A map of the burned area was prepared on the day following the fire. An epidemiological map was prepared daily and every communicable disease investigated, including in addition to the usual "notifiable" diseases, diarrhœa, tonsilitis, sore throat, acute bronchitis, bronchopneumonia and pneumonia.

Numerous analyses of the city water

supply were made and all reasonable steps taken to overcome promptly any threatened dangers of disease.

The milk supply was carefully watched and no milk-borne disease occurred on any dairy farm in the towns and cities from which raw milk was shipped into the city. Whenever any dairy conditions were discovered to be incompatible with the production of wholesome milk, the local authorities were notified in order that the necessary steps could be taken to exclude the milk from the city. While the pasteurization of all raw milk delivered into the city was recommended by the State Board of Health, the local authorities did not insist upon it but did advise the citizens to boil the milk. All milk supplied to the camps was pasteurized.

Similarly, anti-typhoid vaccine was only insisted upon in the militia, but the public were given an opportunity to be vaccinated as a protection against typhoid fever.

All the tuberculosis patients, whose homes had burned, were accommodated in tents in a desirable locality and well cared for.

Perhaps the most useful, single act of coöperation between the State Board of Health and the militia was that of constructing a temporary sewerage system at the more permanent of the two military camps. By order of the adjutant-general, pipes were laid without delay and the necessary latrines constructed. This work was done by the city authorities.

Not a single case of typhoid fever was reported or discovered during, or for some weeks following the fire. A few cases of scarlet fever and other infectious diseases were detected and effectively quarantined, but the city was relatively free from such diseases long after the militia were removed and civilian rule established.

The entire set of experiences disclosed the usefulness and importance of discipline in preventive health work.

The work of the City Board of Health was noticeably strengthened by the military discipline practiced.

Moreover, the simple but effective methods of the military officers of teaching sanitation to the uninformed proved of great service in bringing about safer living conditions, not only in the military camps, but in surrounding places and towns,—and at a trivial expense.

A BACTERIOLOGICAL METHOD FOR DETERMINING MANURAL POLLUTION OF MILK.

JOHN WEINZIRL and MILTON V. VELDEE,
University of Washington.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December, 1914

THERE are many factors in milk production regarding which the sanitarian desires information, but after eliminating that of disease in the dairy, the determination of the extent of manural pollution becomes the most important.

Our bacteriological methods of analysis are aimed quite largely at this factor, and yet at the present time it must be admitted that the object is not satisfactorily attained. The number of bacteria present is dependent upon the age of the milk and the temperature under which it is held, quite as much as upon manural pollution.

The curd test is aimed more directly at manural pollution, but the results are difficult for the sanitarian to interpret. The writers are not aware that it is used at all extensively except in the control of milk in cheese-making.

The determination of the number of B. coli present in the milk indicates more directly the degree of manural pollution, and this determination is now a routine procedure in some laboratories. However, the method has certain obvious disadvantages: (1) It is somewhat complicated and time-consuming and therefore relatively expensive. It is doubtful whether the information gained is worth the price. (2) The organism multiplies in milk at ordinary temperatures; hence if the milk has stood some time, which is usually the case, the test becomes quite useless as an indicator of the extent of pollution. (3) A more serious objection still is the increasing use of pasteurized milk; the pasteurizing process kills the B. coli and hence the method fails completely with this class of milk which comprises the major portion of the supply in some of our larger cities, and is destined to still greater increase. It would seem therefore, that the B. coli test will become limited to certified milk, if it is not abandoned altogether.

Recently the mechanical filter has been employed to detect gross dirt in milk, which is usually manure. The method has apparently proven a most valuable asset to the sanitarian, partly because of the ease of application, and partly because of the tell-tale nature of the evidence afforded by it. Probably the producer will meet this method with more careful filtration, and if the milk is run through a centifrugal clarifier, it must fail altogether. It would seem that the method is destined to a limited usefulness.

In searching for a bacteriological method for determining manural pollution, one that would obviate the disadvantages of the B. coli determination, it occurred to us to make use of B. sporogenes as an indicator. The idea was suggested by the fact that

English bacteriologists to some extent use B. sporogenes as an indicator of sewage pollution in water. Since the organism is a spore-producer and goes over into the spore stage under ordinary temperatures, it is plain that it cannot be entirely killed out by pasteurization, therefore, the manural pollution of pasteurized milk may be determined. Nor would centrifugation eliminate it from the milk. Consequently, the method comes nearer being a universal one than any heretofore proposed, granted that a relation can be established between the numbers found and the degree of manural pollution. The following work was carried out with a view to establishing this relation if possible.

Methods of Determining B. Sporogenes.

We first employed the method suggested by Savage, viz., heating 10 cc. of milk in a test-tube in the Arnold for 10 minutes at 80° C., then forcing down the cotton plug, pyrogaltic acid and alkali are added above, the tube is stoppered and incubated for 24 hours at 37°C. The casein should show a characteristic shredding. While this reaction is quite typical for a pure culture, it is commonly masked when other spore bacteria such as B. vulgaris are present. This method was therefore abandoned.

The Smith fermentation tube was next employed, the 10 cc. of milk being added to lactose liver broth, heated as before, and incubated. If sporogenes is present, gas is formed and the odor is quite characteristic. With this method, satisfactory results were obtained and part of our data were secured while using it.

Later another method suggested itself, one which proved to be simpler and cheaper as well. The handling of the fermentation tubes proved awkward and their cleansing is a task. Instead of fermentation tubes we used plain test-tubes, the liver broth was omitted altogether, the milk sample taking its place. To secure aërobosis sufficient sterile paraffin was added to the tube to make a layer one-eighth of an inch or more in thickness. The tube containing the sample of milk and some paraffin was heated to 80°C. for 10 minutes, cooled, and incubated. If the sporogenes was present the lactose was digested under the anaërobic conditions and the gas formed raised the paraffin plug some distance up the tube. If vulgaris was present, digestion without gas formation ensued. The method was so simple, easy, cheap and rapid that we adopted it for all later work. The suggestion that it be used in determining B. sporogenes in water analysis is scarcely necessary.

The Number of B. Sporogenes in Cow Manure.

Having found a satisfactory method for determining B. sporogenes, it became desirable to determine the extent of its presence in cow manure in order to estimate the extent of pollution in milk. Since our method did not permit us to determine the number directly, we resorted to the scheme employed in finding B. coli in water, viz., finding its limits in a series of fermentation tubes.

The manure which varied from fresh to several days old was added to milk in various dilutions. The results are summarized in Table I.

TABLE I.

SHOWING THE APPROXIMATE NUMBER OF B. SPOROGENES IN MANURE.

Dilution	No. of samples analyzed.	No. positive for sporogenes.	Per cent. positive.	Probable No. of sporogenes per gram.
1:1,000	56	41	73.2	730
1:5,000	54	27	50.0	2,500
1:10,000	54	20	37.0	3,700
1:50,000	14	4	28.5	14,300

It is evident from the table that B. sporogenes is present in manure in greatly varying numbers. There may be present less than 730 or more than 14,300 per gram. The samples contained approximately 83½ per cent. moisture as shown by drying at 100°C. Since the manure that finds its way into the milk supply is usually quite dry, it is safe to say that the probable number per gram is at least four times as high as the table indicates. If we take the results for the 1:5,000 dilution as giving the best average, since exactly 50 per cent. showed more than 2,500 per gram and 50 per cent. showed less, and multiply this number by four to allow for probable loss of water, we would have 10,000 sporogenes as the probable average number per gram of manure as it enters the milk. Undoubtedly this figure will be greatly changed when more extensive data are available but it will serve our purpose for presenting the general contention.

The question naturally arose whether B. coli shows greater constancy than B. sporogenes in cow manure. Accordingly sixteen samples were analyzed in the same manner as before, with the results shown in Table II.

From this limited number of analyses the variation would appear to be even greater than for sporogenes, and there is no loss in accuracy when the latter is taken as a measure of pollution.

TABLE II.

SHOWING THE APPROXIMATE NUMBER OF B. COLI IN MANURE.

Dilution.	No. of samples analyzed.	No. positive for B. coli.	Per cent. positive.	Probable No. of B. coli. per gram.
1:10,000	16	13	81.2	8,120
1:100,000	16	11	68.7	68,700
1:1,000,000	16	7	43.7	437,000

The Number of B. Sporogenes in Market Milks.

It became necessary to apply our method of analysis to market milks. After a considerable number of trials, we decided to use 5, 10 and 15 cc. samples for testing each sample of milk. The results are summarized in Table III.

TABLE III.

GIVING THE NUMBER OF B. SPOROGENES IN MARKET MILK.

Milk used.	No. of samples analyzed.	No. positive for B. sporogenes.	Per cent. positive.	Probable No. of sporogenes per litre.
5 cc.	90	25	28	55
10 cc.	112	42	37.5	37
15 cc.	34	17	50	33

Previous analyses have shown that cow manure under the conditions of our test probably contains about 10,000 B. sporogenes bacteria per gram. If now we assume this figure as a working average, then 10 sporogenes indicate 1 milligram of manure. If this organism is present in 5 cc. of milk but not in 10 cc., then there would be at least 10 in a 50 cc. sample; therefore, 50 cc. samples contain 1 milligram of manure. Fifty litres would contain 1 gram of manure. Its presence in 10 cc. samples only, means that 100 litres contain 1 gram of manure. Likewise if present in 15 cc. only, then 150 litres of milk contain 1 gram of manure.

We have arbitrarily assumed that 1 gram of manure in 50 litres of milk is excessive; that not more than 1 gram in 100 litres is fair milk; and that not more than 1 gram in 150 litres represents good market milk. On this basis our analyses may be tabulated as shown in Table IV.

According to the standard assumed, 25 per cent. of the market milk as represented by the samples analyzed, showed the equivalent of 1 gram of manure per 50 litres of milk. We make no contention for this particular standard for it must be adjusted to

TABLE IV.

SHOWING AMOUNT OF MANURE IN MARKET MILK USING B. SPOROGENES AS AN INDICATOR.

Sample of milk.	No. samples analyzed.	Per cent. showing B. sporogenes.	Presence of B. sporogenes equivalent to 1 gram manure in:
5 cc.	98	25	50 litres
10 cc.	78	54	100 litres
15 cc.	34	50	150 litres

suit the local demands. We do contend, however, that the method seems to afford a valuable means of checking up manural pollution.

If B. sporogenes indicates manural pollution, then certified milk should not show the presence of this organism. Thirty-seven samples were tested but unfortunately only 5, and 10 cc. samples were taken. In no instance was sporogenes found. The contrast is as striking as are the methods employed in the two processes of production.

The crucial test of the method comes in applying it to pasteurized milk; if it fails here, then we are probably no better off than before with only the B. coli test. From an analysis of 110 samples we obtained the results shown in Table V.

TABLE V.

SHOWING THE B. SPOROGENES IN PASTEURIZED MILK.

Sample of milk.	No. of samples.	No. showing B. sporogenes.	Per cent. positive.
5 cc.	110	20	18
10 cc.	110	63	57

Comparing these results with those for unpasteurized milk, it is seen that B. sporogenes is prevalent in about the same proportions in 10 cc. samples, the percentages being 57 and 54 respectively. That it is less prevalent in 5 cc. samples is probably due to the mixing process. It is clear, however, that the method is applicable to pasteurized milk, and this is its strongest point.

Relative to the question whether B. sporogenes increases in numbers in stored milk, only a few tests were made, but these tended to indicate that no increase took place. From the nature of the organism which has its optimum at 37° C., it seems fair to assume that no increase occurs.

Summary.

The investigation would seem to show that the use of B. sporogenes as an indicator of manural pollution in milk possesses decided advantages over the B. coli test in as much as the method of analysis is much simpler and expeditious; further, it can be employed on all classes of milks including even pasteurized, where the B. coli test is manifestly worthless. It can also be applied to centrifugalized or clarified milks where the sediment filter test becomes useless. The method apparently possess a greater general applicability than any heretofore proposed.

A NOTE ON UHLENHUTHS METHOD FOR SPUTUM EXAMINATION, FOR TUBERCLE BACILLI.

J. J. Kinyoun, M. D., Ph. D.,
Bacteriologist, Health Department, D. C.

Read before the Laboratory Section, American Public Health Association, Jacksonville, Fla., December 4, 1914.

THE writer, in 1909, made a preliminary verbal report to the Laboratory Section of the Public Health Association, on Uhlenhuths method for detecting tubercle bacilli in sputum. Since that time until now this method with some important modifications has been employed in the daily routine examination of sputum sent to the laboratory. Now since it has been so satisfactory for rapid and accurate results, and in view of the fact that this method has not been adopted, to the extent I believe it should, it is deemed now of sufficient importance to make a further report somewhat in detail, how it is best employed. Before doing this I wish to disavow any claim for originality of this method, for all credit belongs to Uhlenhuth and his co-workers, and the so-called "Kinyoun method," as it has been referred to by some of my friends, is a misnomer. The only thing which I can lay claim to is to make the method practical for the routine examinations.

The original method consisted of dissolving the sputum in an alkaline solution of hypochlorites of soda (this requiring several hours) and the centrifugalizing the specimen to throw down the bacilli, after which the fluid was poured off, sediment examined. Later, ligroin was added to the digested sputum, which was shaken to mix the ligroin, then the sputum was placed in a water bath and raised to 60°C. By this means the bacilli will rise to the surface together with a layer of detritus, in which the bacilli will be found.

These procedures required several hours, and therefore would handicap a laboratory in getting a prompt report to the physician, which is important. Notwithstanding these drawbacks, the method had such good points, that it was too good to abandon, so I began to experiment with it with a view of overcoming the objections, and soon found how this could be done. In the first place, the digestion of the sputum by the alkaline hypochlorites can be done rapidly, provided the sputum be shaken vigorously for a few minutes. This is best accomplished in a Ricard's Sputum Shaker. The other point is that ligroin can be added to the sputum together with the alkaline hypochlorites without interfering in anyway with the digestion.

The sputum is sent to the laboratory of the Health Department in a wide mouth, square shouldered, bottle of 5 cc. capacity, which takes a No. 10 cork. Each bottle, when sent out, contains 2 cc. of a 1 per cent. solution of compound Cresol (or Lysol) which is placed therein to prevent decomposi-

tion of the sputum before it reaches the laboratory.

The routine which is followed is: On the receipt of the sputum, one cc. of ligroin of a specific gravity of 0.715 is added and sufficient amount of the alkaline solution of the hypochlorites to fill the bottle to the shoulder; this may vary according to the content of the bottle. In case the bottle is full, the same must be poured out, usually about one-third, and then filled as above indicated.

It is then placed in the sputum shaker and vigorously shaken from five to ten minutes, then placed over in the centrifuge which has buckets made to receive the bottles, and centrifuged for ten minutes at moderate speed. The centrifugalization brings the ligroin to the top and a soap-like layer of detritus just under this. The tubercle bacilli will be found in this layer. A platinum loop of the soapy material is spread on a slide and dried fixed by heat or by methyl alcohol and stained for the tubercle bacillus. The ligroin should have a specific gravity from 0.715 to 0.720, this gives much better results than any below or above these points. The action of the ligroin seems to be two-fold; it combines in some way with the waxy envelope of the bacillus, thereby making it lighter, and lubricating it. Another advantage is that there is a tendency for the bacilli to clump, on centrifugalization; where the bacilli are few this is a decided advantage.

Efficiency: I have found that with this method that there is an increase of 19 per cent. of the positive specimens, others have found from 14 to 16 per cent. increase, these latter were based on a larger number than mine.

It is not only more accurate, but is a great time-saver, the number of specimens which one can examine by this method as compared with the old, is at least ten times as many, and with little or no eye strain. The time required to examine a specimen under the microscope is not more than one minute. If after a search of one minute you do not find the bacilli, it is useless to search longer.

Tissues and other substances suspected of being tuberculous, such as pus, blood and feces, can also be digested and examined for the bacilli, but the solvent action is somewhat slower than for sputum. Tissues should be ground with sand or powdered glass to a moderately fine pulp, then the alkaline hypochlorites and ligroin is added to the mass, shaken and centrifugalized. Pus and blood are to be treated in the same manner as sputum.

Feces should be treated in the following manner. If solid, a small amount of water is added and shaken to break up the lumps, then a small quantity of this is placed in a container, to which the alkaline hypochlorites and ligroin are added. This is again shaken and then centrifugalized. Feces, as a rule, contains but very little albuminous matter, unless blood or pus be present, therefore, it does not adhere to the slide, so in order to overcome this, it is best to fix the specimen to the slide, by methyl alcohol, or a small amount of egg white, or horse serum, as the case may be.

It has no advantage over other

methods for detecting tubercle bacilli in urine. This method has its advantages, and disadvantages, it is not at all satisfactory for milk, it does not digest the butter-fat, at all, and acts very slowly on the casein. Even were it satisfactory, I question its value because there are frequently found in milk acid-fast bacilli, which are not tubercle. The specimen does not adhere strongly to the slide as is the case with untreated sputum, so frequently there is a tendency for some of the film to become detached, sometimes, nearly all, when not properly fixed, and will be washed off. So it is necessary to prepare one specimen to a slide rather than several on a single slide, as is sometimes done. Fixation of the specimen is best done by methyl alcohol, but heat is very satisfactory provided it is a little longer than for the untreated sputum.

The method which I have found to be satisfactory for preparing and staining a specimen of sputum is as follows: Specimens are prepared on individual slides. Two lines are drawn across the slide with a wax pencil, allowing a space of about $\frac{3}{4}$ inch between them. A loop of the soapy layer is spread on the slide between the wax lines, and allowed to dry, then fixed by heat or methyl alcohol. Carbol-fuchsin is added until the space between the wax lines is covered. These wax lines confine the carbol-fuchsin to the space and prevents it from running over the slide, moreover, there are occasionally specimens, which are refractory to the stain, which will run off unless so confined. The staining is made at ordinary temperature and in from one to three minutes, heat is not necessary although is not contra indicated.

Decolorization is best accomplished by a 3 per cent. solution of hydrochloric acid in 95 per cent. alcohol, and stained with Löefflers methylene blue for contrast. Gabbetts decolorizing solution does not work well particularly when the film is thick or unevenly spread. The carbol-fuchsin solution which is employed for cold staining is one which I have been using for the past 20 years, and differs somewhat from the Zeihl-Neilsen. It is:

Fuchsin basic..... 4 grams.
Acid carbolic (Cryst. Merck) 8 grams.
Alcohol 95 per cent..... 20 cc.
Water.....100 cc.
Filter.

The solution of the alkaline hypochlorites is practically the Liquor Sodæ Chlorinæ, U. S. P., of a double strength to which is added $7\frac{1}{2}$ grams of caustic soda to each 100 cc. The amount of chlorine is important and should be from $5\frac{1}{2}$ to 6 per cent. Any percentage less than this is not so effective, and below 3 per cent. is of no value.

The solvent action depends on the amount of available chlorine, and of the percentage given. A larger amount of available chlorine does not seem to hasten the digestion, nor an increase of the free alkali, but on the other hand interferes with the staining quality of the bacilli. This solution is fairly stable, it lasts from 2 to 3 months without much deterioration.

The commercial article known as "Antiformin" has not given as satisfactory results as could be desired, several lots were tried out, and all ap-

peared about the same strength. The amount of available chlorine was much below 6 per cent. So on comparing a home-made article with this, the trouble was found to be in the chlorine content. Since then all the alkaline hypochlorites have been prepared in the laboratory. It is rather tedious to prepare, although not difficult.

The prerequisite is a good fresh chlorinated lime which has at least 30 per cent. available chlorine. Ten pounds or 4,500 grams of lime are placed in a covered stone or glass jar and sufficient water is added until it is a thick mush. Three thousand two hundred and fifty grams of washing soda is put in a stew pan and sufficient water, about 2,500 cc. is added to bring the soda in solution, when boiled. While boiling add this to the lime and stir it well when adding. Allow this to stand for 4 to 6 days, stirring it well each day. Then filter and estimate the amount of available chlorine. If above 6 per cent. add sufficient water to dilute it to this amount. Then add $7\frac{1}{2}$ grams of caustic soda to each 100 cc. and filter.

If the chlorine content is high, a liter of water can be added to the lime residue and filtered off. Sometimes 2 to 3 exhaustions can be made, before the chlorine content falls below 6 per cent.

The hypochlorite solution can also be made by passing chlorine gas through a 50 per cent. solution of caustic soda, than after ascertaining the amount of chlorine, add $7\frac{1}{2}$ grams of caustic soda. Unless large quantities are required, this method is not available.

The alkaline hypobromates also digest sputum, but its action is somewhat slower, but it does not interfere with the staining quality of the tubercle bacillus.

A method for preparing it, which I have found to be good, is to take an Erlenmeyer flask of 1,000, to 1,500 cc. capacity, and pour into it about 100 cc. of water, then pour in from 5 to 10 cc. of bromine. The water will prevent escape of the gas and the flask will confine almost all the gas set free in the pouring. Small quantities of a stock solution of 50 per cent. caustic soda are added until all the bromine is conbined, and a bright greenish yellow fluid results. This can now be tested for the amount of available bromine and diluted to $7\frac{1}{2}$ per cent. when 5 grams of chloride of lime (not the hypochlorite) or chalk are added, to each 100 cc., together with 15 cc. of the 5 per cent. solution of caustic soda, then it is filtered and ready for use.

The addition of a lime salt is essential, for unless lime be present, the unsoluble soapy layer will not form, and although the bacilli are brought to the top, with the ligroin, the preparations are fixed with difficulty and are more liable to wash off during the process of staining.

The same may also be said with regard to making the hypochlorites from chlorine gas, here the addition of a lime salt is necessary just as for the hypobromites.

BUREAUS OF WATER SUPPLIES.

EDWARD BARTOW,
Director of the Illinois State Water Survey, University of Illinois, Urbana, Illinois.

Address of Chairman Laboratory Section, American Public Health Association, Jacksonville, Fla. December 1, 1914.

THE United States government and the state governments should maintain special bureaus for the investigation and control of water supplies. The United States government bureau must of course control the purity of water in interstate streams and the quality of water furnished by common carriers in interstate traffic. The state bureaus must control the purity of water in streams and ponds within the respective states and must control the quality of water furnished by the various municipalities and even must control private supplies of the citizens in the state. The bureaus must have more than mere routine control laboratories. They must be ready with staff and equipment to make investigations of methods of analysis to determine standards of purity or to make any other investigations on which the routine tests may be based or by which results of analyses may be interpreted.

The development of water supply control has been comparatively slow for it has been the custom, apparently for administrative reasons, to place the control of water supplies in a bureau or department having other duties. It has been very natural to place the control of water supplies in the health department; for no one cares to deny that the health of the water consumer is of the greatest importance and therefore that the control of the purity of water used for drinking purposes is the most important duty of a water bureau. In practically all of the states, therefore, where any control of the water supplies is attempted, it is done by a bureau or department that is a division of the board of health. Among the many duties that must be performed by a board of health the work of the water bureau or division is very often considered of minor importance. If no specific appropriation is made by the legislature, and if those in charge of the general bureau have insufficient funds to perform all of their duties, the work of the water laboratory is usually neglected.

We wish to emphasize our belief that the federal and state water bureaus must be given more liberal support and especially more extensive powers than is the custom. The powers must be broad enough to include the duties of two extremes of routine laboratory work, at the one extreme the duties of a laboratory which under the control of a health officer is merely an adjunct to the health department or merely performs routine work to determine the quality of drinking water; and at the other extreme those duties performed by a railroad laboratory under

the control of an engineer, who is interested only in saving money by obtaining a satisfactory boiler water and who often entirely neglects the quality of water furnished to passengers for drinking. Further the laboratory or bureau must be given freedom to make any scientific investigations that have connection with water problems. It must have freedom to investigate or develop new methods of analysis, new methods of water purification, and new methods for the purification of sewage or trade wastes, whenever and wherever these may be proposed. Health, comfort and convenience is dependent on the quality of water and the bureau must be prepared to deal with hygienic, æsthetic and economic water problems.

The laboratory for the investigation and control of water supplies should include divisions of chemistry, biology, bacteriology statistics and engineering. The bureau may be in charge of a physician, a chemist, a biologist, a bacteriologist, a statistician, or an engineer, but in any case a man should be chosen who will be broad minded enough to understand the necessity for the investigation of all water problems.

A review of the progress of water supply control for the past thirty years shows that the most marked progress has been accomplished through the efforts of bureaus which have been almost if not quite independent. The state of Massachusetts, for example, made a specific appropriation for the control of the water supplies of Massachusetts and the work of this laboratory has been epoch making. The city of New York has apparently given the directors of Mt. Prospect laboratory a free hand for the publications from this laboratory have helped greatly to advance the science of water supplies. Special studies at Columbus, Ohio, and at the experiment station of the Sanitary District of Chicago are noteworthy. Large cities like Cincinnati and Louisville have conducted special investigations in connection with the establishment of purification plants. These investigations have been important factors in extending our knowledge of water supplies and water treatment. The continuation of the laboratories, in these cities under the direction of specialists after the completion of the purification plants has also been an important factor in extending our knowledge of routine control of water purification.

It is a bad plan to assign the examination of the quality of water to one department and the furnishing of a sufficient quantity of water to another. We have heard of cities where it is the duty of the engineering department to furnish the water and the duty of the health department to determine its quality. The engineering department considers only the necessity of obtaining a sufficient supply and deems it an interference when the analyses by the health department show that the water supply is of impure quality. The health department considers only results obtained in routine examinations, condemns the water and is unable to offer a remedy that will assist the engineering department to obtain pure water. Without coöperation, under such conditions the water remains impure indefinitely, perhaps

until a serious epidemic arouses the citizens and compels the authorities to purify the water. It is surely desirable to have a bureau or department of water supplies whose sole business it shall be to furnish an abundant supply of pure water.

The larger cities can of course easily maintain a special bureau of water supply. It is, however, practically impossible for smaller towns, individually, to defray the necessary expenses of an efficient water supply bureau. Several small cities may unite to maintain a bureau of water supplies or each state may maintain a bureau. This community or state bureau should have the coöperation of every municipality within its area. To enumerate some of the duties of the state bureau: The state bureau must collect accurate statistics concerning the quantity and quality of the water supplied to all the citizens of the state in order that corrective measures may be applied where necessary. It should have the power to compel cities to employ competent engineering assistants to properly plan new water supplies. Each city should make the necessary routine chemical and bacteriological tests to control the quality of water and each city having a purification plant should carry on simple daily control tests in order that the water supply may be ever pure. The state laboratory should know that these tests are properly carried out either under its own direction or under the direction of competent consulting sanitarians.

Owing to the fact that the economic features of any problem appeal to the general public, the state bureau should take control not only of the quality of the water from the hygienic standpoint but also from the economic standpoint. Experiments that will be of general interest should be carried on to determine the best methods of softening water, the best methods of preventing scaling, corrosion and foaming in boilers, the best methods of treating water for special manufacturing uses and the best methods of treating and utilizing trade wastes. While such experiments are not directly the function of a health department, whenever the water bureau is in the department of health, executive health officers should promote their solution. The solution of economic problems will render it more easy to obtain funds for the solution of the hygienic problems.

State bureaus have necessarily a limited influence. There should be a permanent national bureau of water supplies which can coöperate with all the state bureaus. As the state bureau should be a clearing house for community bureaus, the federal bureau should serve as a clearing house for coöperative work to be carried on by the various state bureaus. It may be claimed that the general government can deal only with interstate problems. The interstate problems are very important and will become more so as the population of the country becomes greater. The investigations of the condition of the Potomac and Ohio Rivers carried on under the direction of the Hygienic Laboratory of the United States Public Health Service are examples of what can be done. Let us hope that the laboratory estab-

lished at Cincinnati may be continued after the present investigation of Ohio River is completed in order that a record may be kept from year to year of the condition of the river.

The federal bureau should maintain an experimental laboratory in which studies could be made of problems which are of interest to two or more states. In order to properly enforce the rulings of the Treasury Department with regard to standards of water for interstate carriers, the Hygienic Laboratory or a federal bureau, should have examinations made by its own agents throughout the whole country. The United States government should maintain a central laboratory and division laboratories, similar to those maintained by the Department of Agriculture for the enforcement of the pure food laws, a central laboratory in Washington and branch laboratories throughout the country. As a beginning the laboratory fitted up at Cincinnati, Ohio, for the study of the conditions of the Ohio River can be made a permanent division laboratory and similar laboratories can be installed wherever necessary to promptly and efficiently obtain the requisite knowledge of the condition of water served on interstate carriers, and to enforce the regulations made by the department. Such an arrangement should be welcomed by the various state organizations.

Coöperation of the federal bureaus with the state organizations and both with city or community organizations will bring about more efficient control of the purity of all our water supplies resulting in the improvement of the comfort and health of all our citizens.

DANGER TO LAUNDRY WORKERS OF INFECTION FROM THE HANDLING OF SOILED LINEN.

EBBA ALMGREN DEDERER, M. D.,
Committee on Occupational Diseases of Woman's Department of The National Civic Federation.

DOES THE "MIXED WASHING" IMPERIL PUBLIC HEALTH?

THE possibility of dissemination of disease through laundries was suggested by the fact that bed linen and body linen of different customers are washed together, though usually in separate compartments in the same rotary washer, and in steam laundries doing the washing for the so-called hand laundries the clothes are packed in coarse mesh bags—"nets"—and washed without being removed from the bag.

The manager of one of the most up-to-date laundries, a former bacteriologist and chemist, undertook the following experiment in order to determine the possibility of infection through "mixed washing." Sterilized clothing was placed in a "net" with clothing contaminated with gonorrheal discharges. After the "net" had been subjected to the ordinary washing process it was found that one third of the previously sterile clothing was contaminated with gonococci.

This experiment, while interesting, is without value in that no cultures were made to determine whether the organisms had been killed in the washing process. The question has been studied by bacteriologists here and in Europe. Wurts and Tanon have made the following tests to determine the bactericidal effect of the ordinary washing process. Strips of muslin, soaked in virulent cultures of typhoid, dysentery, colon, anthrax, and cholera bacilli, streptococci and staphylococci, were put through the ordinary washing process. No growth was obtained, showing that none of the germs survived. In soiled body linen and bed linen the microörganisms are protected by the albuminous substances in the secretions and discharges containing them. The tests were therefore repeated with strips of muslin dipped into a solution of albumin before being soaked in the respective cultures. The results were again negative. Martin of the Pasteur Institute in Paris also concluded that linen is sterilized in the washing process.

It is possible that the contaminated discharges are mechanically removed by the first rinsing which *precedes* the actual washing, and this theory is supported by its enormously high bacteria content (Miguel, *Revue d'hygiene*, VIII, 1886, p. 388), one to two millions of pathogenic organisms to each cubic centimeter.

The sterilizing action of the washing process is due, in the order of their importance, to the high temperature to which the clothes are subjected, soap and washing soda, other chemicals.

Heat.—The maximum temperature of the wash water varies from 110° C.

to 160° C. in different laundries. The average maximum temperature is 150° C. The drying rooms and "hot air tumblers" are heated to 140° C. to 180° C. The mangles are heated by steam under pressure of from 3 to 6 kgm. (135°–160°). The higher temperature is necessary for a "good finish." The machine ironers and hand irons are usually heated to 135°–145°.

The lowest temperature at which different fabrics are sterilized is: 140° C. for woolen; 120° for flannels; 110° for muslin. Flannel and colored muslin and linen are usually washed in water not exceeding 110°, but, as the irons and mangles are heated to at least 135°, even these fabrics are sterilized by heat.

Exposure to 150° for 8 seconds sterilizes all fabrics, as the protoplasm of microörganisms coagulates at 120°–150°. Even spores of anthrax and tetanus are killed in 4 minutes in boiling water, or by exposure to a current of steam at 100° for 5 minutes (Pfuhl).

Soap.—Rodet, in determining the antiseptic properties of plain soap, tested the inhibitory action on the growth of bacteria in favorable culture media, and also the direct bacteriolytic action. He found that 1 per cent. solution of soap not only inhibits the growth, but actually kills the typhoid bacilli in a few minutes. The average strength of the soap solutions used in laundries is 1½ per cent. to 2 per cent. The antiseptic action of soap rises with the temperature, and is also increased by the addition of sodium carbonate, which acts by virtue of the sodium liberated. The contact with the disinfecting alkali is multiplied by the constant rotary motion of the wash wheel.

The addition of antiseptics does not materially enhance the bacteriolytic action of soap, according to Reithoffer. Hence the potassium permanganate soap prepared at extra expense for one laundry in New York City is not more efficacious than the plain soap.

The action of disinfectants is enhanced if the clothes have been previously moistened. Chamberland and Fernbach made some tests on B. subtilis, the organism most resistant to heat. They found that a 10 per cent. solution of calcium hypochlorite at a temperature of 15 degrees C. killed all non-spore-bearing organisms in 15 to 30 minutes if the linen had been soaked in cold water, but required 2 hours if the linen was dry. The disinfectants penetrate into the cell protoplasm of the microbes with greater ease if the enveloping cell membrane is moist.

Other Chemicals.—Chief among these is calcium hypochlorite which is used in filtered solutions of from 1.5 per cent. to 3 per cent. Opinions differ as to the antiseptic value of calcium hypochlorite. Kolesnikoff states that a 5 per cent. solution kills dried anthrax spores in 10 minutes. Koch, on the other hand, found them alive after two days.

Some New York firms have abandoned the use of calcium hypochlorite and bleach the clothes with watery solution of chlorine gas generated by electrolysis on the premises. Flannel

is generally bleached by dilute sulphuric acid with 2 per cent sodium bisulphate which combine to form sulphurous anhydride with liberation of oxygen.

Dilute hydrochloric acid or acetic acid are used in blueing the clothes.

Occasionally attempts have been made to introduce chemical antiseptics, notably zonol, but they have been abandoned after brief tests, usually on account of the unpleasant odor to which the customers object, on account of fixing stains, or on account of damage to fabrics, which, however, can be avoided, in the case of bichloride by the addition of HCL.

It is obvious that there is no danger to public health from "mixed washing" of clothing with contaminated articles. However, while the washing process practically sterilizes the clothes, reinfection of clean linen is possible where it is sorted and counted in the same room with soiled linen. Clean linen, when exposed to infection through contact with soiled linen, may disseminate the infection.

Are Diseases Transmitted Through Soiled Linen?

Why have the present methods of disinfection and quarantine failed to stamp out infectious diseases?

Because: (1) Reportable diseases are not always reported. Many parents evade declaration, and mild or atypical cases frequently escape detection, or are accidentally discovered as in one case in my experience in which a child was brought to a dispensary to be vaccinated and was found to have scarlet fever. (In this case the family washing was sent to a "wet wash" laundry.)

(2) Many diseases are contagious before it is possible to establish the diagnosis, *e. g.*, measles is contagious during the incubation period.

(3) Not all infectious diseases are reportable, as influenza and erysipelas, or, if reportable, impossible to isolate properly, as trachoma.

In view of the fact that soiled body linen is known to harbor the disease-breeding organisms discharged from the host, is one not justified in considering the manipulation of soiled linen as one of the possible causes of the failure to eradicate the infectious diseases?

The pathogenic organisms in soiled linen may cause either *direct infection of* the workers manipulating the linen, or *indirect infection through* the workers (carriers). Inhalation of dust and the poor ventilation predisposes to infection of the mucous membranes, and thus prepares the soil for infection.

There are three modes of infection—inhalation, inoculation (through wounds, or through touching the face and eyes), ingestion (wetting the fingers in counting the clothes, or through eating).

Arlidge states that "when washing the clothes of the sick, washerwomen are exposed to contagion, are liable to erysipelas following abrasions, to onychia and festering sores of the fingers. When a mechanical hurt happens to their hands in a softened state, the wound is difficult to heal and often suppurates."

The superintendent of the laundry in one of the city hospitals stated that

before disinfection of the linen in the wards was enforced, infected hands were extremely common among the workers.

The high bacteria count of soiled clothes is shown by Miquel's experiments. He found that the bacteria count of the "first water" is higher than of the impurest sewerage, 25,000,000 bacteria to 1 cc. Of this number 2,000,000 are disease-breeding, as already stated.

Typhoid bacilli have been isolated from the bed linen and body linen of typhoid fever patients as early as the third day of the disease in some cases (Remy), and on the twelfth day in the average case (Vidal and Chantemesse, quoted by Marquet, *loc. cit.* p. 28). Murchison cites a case (Marquet, *loc. cit.* p. 29) in which typhoid fever was contracted from the bedding used by a typhoid fever patient.

The resistance of typhoid bacilli is very great. Epidemics have been caused by pollution of stream with surface water after the bacilli, deposited on the ground through typhoid carriers, have been frozen for months.

The typhoid bacillus is known to retain its virulence for one month in a dry medium; hence the disease may be communicated to those who handle linen soiled with typhoid excreta.

Scarlet Fever is contagious during the period of incubation and the prodromal stage, as well as during the stage of desquamation. The virus retains its virulence for long periods.

Vergeley cites an instance (Joltrain, *Journal d'hygiene*, 1893, p. 546) in which a physician contracted scarlet fever from a coat which he had worn one year previously while attending to a scarlet fever patient. The coat had been sent to his country place, and when he went there a year later he developed scarlet fever a few days after wearing the coat.

The atypical forms without any rash not infrequently escape detection, and many cases of so-called tonsilitis are in reality scarlet fever.

Measles is also contagious during the incubation period. It is known that the virus of measles loses its virulence after a few hours (Grancher, quoted by Marquet, *loc. cit.* p. 32). Infection would be possible, however, if clothing were sent to a laundry within a few hours after being removed from a child with measles.

Diphtheria.—One has only to call attention to the number of cases of persistent nasal discharge without marked constitutional disturbances in children, due to the Klebs-Löffler bacillus, besides the great number of carriers, to see that clothing handled in the laundries may expose the workers.

Whooping Cough.—The same is of course true of whooping cough, as its causative agent is harbored in the nasal discharge and bronchial secretion.

Smallpox.—Dardeau mentions epidemics in paper factories in France traced to linen rags coming from California where the disease raged. Several similar epidemics in England have been studied by Pearson in the period 1875–1881, and an epidemic in Boulogne-sur-Seine in 1900 was traced to a laundry.

I quote the following from the report of the English Lancet Commission, 1877:

"At the St. George's Public Laundry, a washerwoman, instead of emptying the copper used by her predecessor, boiled her linen in the same water, and as her husband died of smallpox a few weeks afterwards, and her child was very ill with the same disease, the widow made inquiries and found that the woman who had washed before her had smallpox in the house. Probably, however, the disease was not caught from the copper where the water boiled, but from the floor, etc."

"A washerwoman continued to take in washing while her boy was ill with smallpox. In addition to exposing the customers to infection, the boy's aunt, who assisted at the washing, took the disease home to her husband, who became ill three weeks after the boy and died in a few days."

Tubercle bacilli are quickly killed by drying and exposure to sunlight, but live long in moisture. Handkerchiefs, an excellent vehicle for tubercle bacilli, are difficult to count accurately, because they stick together and get lost among the bigger pieces, and require much handling and shaking, and sometimes have to be counted several times over.

Nevertheless, the mortality from tuberculosis among laundry workers compares very favorably with other trades. Ira S. Wile in 1904 found that 5.3 per cent. of laundry workers have tuberculosis, as compared with 17.6 per cent. in some other trades. Landozy and Marmisse (Marquet, *loc. cit.* p. 38, 40) give a slightly higher figure, but still lower than in other trades.

Lombardo (Marquet, *loc. cit.* p. 38) has found that those working in an atmosphere of high humidity are "practically immune" to tuberculosis, which may account for the comparatively low figures.

At the Brompton Consumption Hospital 2.5 per cent. of the patients for the period of 1889–1891 were laundresses.

The experiments of Letulle, reported before the Academie de Medecine, July 22, 1913, give valuable data on the infectivity of linen contaminated with tubercle bacilli. Out of 50 guinea pigs breathing air in which handkerchiefs contaminated with dried tuberculous sputum were shaken, 45 died of tuberculosis of a very severe form. Letulle concludes that shaking and manipulation of soiled linen of tuberculous subjects, especially the handkerchief, is unquestionably an important factor in the transmission of the disease. The experiments of Chausse support his view. The period of infectivity does not extend beyond the twentieth day unless the clothing is put away while moist.

Venereal Diseases.—The bacillus of Lustgarten does not easily resist drying so it is unlikely that syphilis is propagated through the medium of soiled linen. On the other hand, the ease with which gonorrhea is transmitted through clothing is shown by the fact that the admission of one gonorrheal child to a hospital ward makes the disease spread like wildfire. At the Babies' Hospital in New York the attempts to control the spread of

gonorrhea were unsuccessful, despite rigid disinfection of the diapers, until their use was abolished and they were replaced by paper napkins.

In view of the widespread prevalence of this disease, the fact that the best laundries refuse to accept linen from disorderly houses offers very poor protection to the laundry workers.

In the light of recent investigation it is thought that transmission of disease germs is nearly always "immediately from one warm, moist mucous surface to another, and rarely by intermediate transmission" (Northrup).

If this be true of the exanthemata, it can hardly apply to the air-borne diseases, *e. g.*, influenza, and to many grave infectious diseases, *e. g.*, the venereal diseases, typhoid fever, etc., which are known to be transmitted through fomites.

The question therefore arises: What measures have been taken, or can be taken towards protecting the workers?

The importance of this subject was already recognized in England in 1877, when a Lancet Commission was appointed, as a result of "cases of undeniable transmission of disease, especially smallpox, through the intermediary of laundry workers," to determine the danger to workers and to the public from soiled linen. The commission condemned the practice of handling soiled linen in the same room where clean linen is kept, "as we do not always know when clothes are infected, and must sometimes unwittingly send them to the laundry when they should be sent to the disinfecting oven."

Nine months later the first model municipal laundry was established. Its chief feature consisted in a receiving section separate from the laundry proper, with a separate staff of workers, and equipped with two tanks with cold, *running* water, charged with carbolated soap in suitable proportions, the one with the weaker solution for ordinary linen, and the other tank for suspected or especially soiled linen. Baskets provided for the customers were divided into two compartments, and on arrival at the receiving house, the contents of each compartment were emptied into their respective tanks. In this manner all handling of the soiled linen was eliminated.

Lord Lytton, in introducing the laundry clause in the Factory and Workshop Bill in 1902 stated that small laundries present a greater menace than the large ones and are centers of diffusion of contagious diseases, especially smallpox and scarlet fever.

In Paris the "bateaux-lavoirs" (special river boats used for the purpose of soaking soiled linen in the Seine in order to dislodge the albuminous discharges before the actual washing) had been in existence since the year 1623. Attention was accidentally drawn to this nuisance in 1885 when they had become so numerous as to impede traffic. The prefect of police of the Seine district then commissioned Miquel to report on the possible contamination of the Seine through the bateaux-lavoirs with the result that their use was henceforth prohibited.

The danger to workers was recognized by the Board of Health of the

District of Gironde, and in 1889 a law was passed enforcing the establishment of tiled rooms for the sorting and counting of soiled linen, the use of impermeable bags for the collection of soiled linen, and other measures for the safeguard of the workers.

The Paris Municipal Council appointed a Commission in 1896 to study the diseases which laundry women may contract from sorting, counting and marking soiled linen. Deschamps, Medecin Inspecteur de Service des Epidemics, who drew up the report, stated that the risk to workers was obvious, and dwelt especially upon the danger of the small laundries.

In 1905 the following rules were passed in France:

(1) All soiled clothes shall be received in closed bags of impermeable material, which must not be opened in the delivery wagons.

(2) The bags, with contents, shall be disinfected before handling by the workers.

(3) Gowns, worn exclusively at work, shall be provided for those handling soiled clothes. Before leaving the building the gowns shall be hung up in rooms provided for the purpose. These rooms shall be equipped with washstands and the workers shall be compelled to wash hands and face before leaving the room.

(4) Soiled linen shall not be received, sorted, marked or counted in rooms where clean linen is kept.

(5) The first rinsing water shall be led off in *covered* gutters.

(6) Eating or drinking in rooms where soiled linen is kept shall be prohibited, and workers shall be instructed in personal hygiene and informed of the dangerous character of work.

(7) All workers must present certificates of vaccination.

In the public laundries of *New York State* practically no measures are taken for the protection of the workers.

In some laundries the soiled clothes are sorted, marked and counted in separate rooms, but in the majority they are manipulated in the same room, and often in close proximity to the clean clothes. In one otherwise up-to-date laundry with a large trade from the transportation companies, the soiled table and bed linen from the transportation companies is received, sorted and counted in an anteroom, while the family linen—of course the most infectious—is handled in the same room with the clean linen.

An attempt is made in the better laundries to minimize the manipulation of soiled linen by the use of the "counting board" and the mechanical marker, but even then a certain amount of shaking and handling is inevitable.

The following bill was introduced into the legislature but was defeated through the efforts of laundry owners on the ground of prohibitive expense.

ASSEMBLY (Feb. 3, 1909). BILLS (No. 455, Int. 440).

An Act for the Supervision of Laundries for the Prevention of Contagious Diseases.

Introduced by Mr. Baumann, Feb. 3, 1909, read once and referred to the Committee on Public Health.

SECTION I. That all places doing business as laundries or any place

accepting public washing shall not receive or accept any washing, unless said washing is confined to a cloth bag properly tied, the contents of which shall not be removed in said laundry, or any place in connection therewith, for any purpose until the contents of said bag has been subjected to a heating fumigation of not less than two hundred and twelve degrees of heat for not less than twenty minutes.

SECT. II. The violation of the provisions of this act shall be deemed a misdemeanor, punishable by a fine not exceeding fifty dollars for the first offense, and punishable by a fine of not less than twenty-five, nor more than fifty dollars, or imprisonment not exceeding thirty days, or both, for the second offense.

SECT. III. It shall be the duty of the department of health of all counties to enforce this Act.

SECT. IV. This Act shall take effect September 1st, 1909.

We have seen what has been and is being done toward laundry regulation in France and England, and that the seriousness of the subject is realized in those countries. The only evidence of similar activity in this state met the concerted action of laundry owners who killed the one and only attempt to remove the danger of infection through laundries. The fact that the remedial measure suggested in Baumann's Bill was not practicable is no reason for letting the evil continue unabated.

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Since the conclusion of this study a very pertinent illustration of the danger to laundry workers was furnished in April when New York City was threatened with an epidemic of smallpox. A woman who came from Jacksonville, Florida, where smallpox had broken out, developed the disease after her arrival in New York. The colored woman who was employed as laundress in the family visited by the smallpox patient was later taken ill with the same disease.

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MUNICIPAL HEALTH OFFICERS AND VENEREAL DISEASE.

Dr W. A. Evans,
Health Editor, Chicago Tribune.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

THE method for the control of venereal disease now in vogue in the United States army is as follows:

1. The A & N prophylactic packet was designed, as to formula and package, by the officials. For a time it was distributed by the government to hospitals. Now its sale in the post exchange is recommended by the surgeon-general.

2. The rules prescribe that any soldier who has been exposed, upon returning to camp, shall at once report at the hospital where he is given a local treatment with silver salts or potassium permanganate and calomel preparations.

3. Any soldier developing a venereal disease acquired after enlisting is punished unless the record shows that he was treated at the hospital subsequent to exposure. Punishment is for disobedience of rules and not for having a venereal disease.

4. Venereal disease is reportable.

5. Dispensaries and hospitals for venereal disease are provided.

6. Laboratory facilities are provided for diagnosis of venereal disease.

7. Men excused from duty on account of venereal disease lose their pay during the period of disability and also have to make up time lost.

8. The men are taught the facts concerning venereal disease by lectures and pamphlets.

9. Prostitutes are kept off the reservation and as far as possible from its bounds.

The United States army had its maximum venereal disease admission rate in 1905. That rate was 200. Since that time the above methods of prevention have come into use. One effect of centering attention on a disease, particularly where new methods of diagnosis and treatment are proposed, is securing so much more complete reports of cases as to cause an apparent increase of cases. In spite of this influence the rate in the United States has fallen to a rate in 1913 of 85.83. I am informed by army officers that a further and continued fall is expected.

Certain European army venereal disease admission rates are as follows:

British Army	66	1909	
German Army	19	(Kean)	1912
French Army	27.8	"	1907
Austro-Hungarian Army	54.2	"	1907
Spanish Army	92.66	"	1908
Russian Army	54.3	"	1908

Venereal disease in various navies (1905 to 1909—Kean):

German	66
French	75
Italian	83
Japanese	167
British	120
American	160 (1909)

Since 1880 New Orleans has been free from yellow fever with the exception of one or two invasions.

The quarantine methods prior to 1880 were stricter than public opinion would endorse. In 1880 the method was changed from the Jones to the Holt quarantine. Public opinion was ready for the Holt quarantine and in consequence it was a success. As we know the epidemiology of yellow fever neither method was right. The Holt was no nearer than the Jones but it succeeded better because it permitted greater personal liberty.

When we come to discuss municipal control of venereal disease it is proper to discuss in detail the procedures employed by the military arm to discover what is applicable to municipal conditions and how it can be applied.

As to education Doctor Fronczak of Buffalo says: "The treatment of venereal diseases has too long been left in the hands of charlatans and leeches who suck out the gold while they frighten their victims into a silence. Their victims are numbered by the thousands. Why this disease, which always has been and always will exist, should be left in the hands of quacks and unscrupulous persons, rather than treated by reputable physicians or assisted by municipal authorities, is explainable only through the delicacy felt by the unfortunate victims. At one time patients suffering from cancer or tuberculosis considered the same privacy as essential, and in some places this condition is still met, but it is gradually fading. We can readily understand why a man or woman, who, either innocently or otherwise, has acquired a venereal disease, should shrink from permitting that fact to become public property. For the same reason they do not always consult their family physician whose counsel and help would be inestimable. In order to preserve their secret they usually consult advertising quacks and learn, when too late, that they have done the very thing they sought to avoid. The quack who can thrive only by fraud, deceit, and everything that is unscrupulous, throws out such alluring baits, both as to his guarantees to cure and his work without pay, that the victim allows him to proceed. It is soon found that these guarantees and promises must be met by the patient with the required amount of cash and the patient finds that this is the beginning of a continuous blackmail. Is it any wonder that we have hereditary syphilis, that our asylums are becoming more and more crowded, and that our suicides increase?

In many parts of the country, health departments or private philanthropies, or both, have started reactionary measures, such as making venereal diseases reportable like other communicable diseases, making free examinations for gonorrhœa and syphilis, providing hospital care for those in need, and what will perhaps be the most efficient of all, the inauguration of a system by which the influence of the venereal quack is minimized. This is done by a systematic meeting of the quack's methods. Public waterclosets which are plastered with venereal advertisements, are decorated with warning cards. Public advertisements

in the press are offset by other advertisements issued for the purpose of calling attention to the impossibilities of fraudulent advertisements, the impossibility of curing as guaranteed, and the impossiblity of any person existing and continuing to do business under heavy expense without proper remuneration, and, therefore, the impossibility of treatment without pay, and finally advising such unfortunates what to do. All these methods are valuable. Each has its advocate, and each must leave an impression.

From many years of observation I maintain that nothing will be accomplished until authority is vested where it belongs, namely, in public health departments. My first plan would be to make it impossible for any person to practice a medical fraud. It would seem that there is already sufficient law covering this point, but it is difficult to enforce. The influence of the quacks, through the millions they spend in advertising is so great as to render it extremely difficult to put them out of business. In Buffalo we have succeeded in abolishing a few of the worst ones by merely obtaining a fraud order from the Post Office Department by which it was impossible for the quack to receive mail, and which also made it impossible for the papers containing his advertisement to be mailed. No community will tolerate another person who advertises deceit and fraud, and why the medical quack should be given preference is difficult for the ordinary person to comprehend. Not only this, but it is an insult to the common decency of every community."

Health officers will adapt the methods of education employed to suit their communities and to accord with their own judgment.

The A & N protective packet will be taken care of by the commercial interests. They will operate by vending machines as well as through drug stores. Health departments need not concern themselves about this procedure.

The cleaning up after exposure and the punishment for failure to comply with rules bearing on this subject have no place in the program of a municipality. Of these procedures in use by the military arms the following educational measures—laboratories, dispensaries, and hospitals, reporting and the regulation of commercialized vice—are in some measure within the province of state and municipal health departments.

The second natural next step is equipping the laboratories to do diagnosis work in venereal diseases. The most important work and that with which the laboratories should begin is the examination for spirochetes and for gonococci, in the fresh infections. This should presently extend to embrace Wasserman's and complement fixations. It happens that the examinations which are easiest done are those which disclose the diseases in their most actively infectious stages. If a laboratory is pushed for time let it abandon the chemical examination of milk to make place for venereal disease work. Many health department laboratories are now doing work on venereal diseases. New York leads in such efforts.

The third step in natural sequence is the establishment of dispensary facilities.

In 1910 Chicago began this work with a municipal venereal disease dispensary run as a part of the work of the Iroquois Memorial Hospital. This work is now in abeyance but it will be renewed. New York began with a dispensary for counsel and advice. It operates largely to keep the unfortunates out of the hands of the quacks. In time it will assume all of the legitimate functions of a dispensary.

Venereal disease dispensaries should run in the evenings as well as during the day; on Sundays as well as on week days.

As venereal disease cases during their actively infectious stages are not confined to their beds, venereal disease dispensaries will be in greater demand than venereal disease hospitals. They will perform a much greater service and dollar for dollar they will care for more cases than will hospitals. Nevertheless in the larger cities venereal disease hospitals will be the natural next step. The Chicago Vice Commission recommends that there be one bed set aside for venereal disease for each 2,000 inhabitants.

In order to secure a proper interest in venereal diseases and to make it possible to operate measures for control it will be necessary to have venereal disease reported. I have been able to find the following laws and ordinances dealing with this subject:

Vermont—"Sec. 1. Commencing on the date of the passage of this act the superintendent or other officer in charge of public institutions such as hospitals, dispensaries, clinics, homes, asylums, charitable and correctional institutions, shall report promptly to the State Board of Health the name, sex, age, nationality, race, marital state, and address of every charitable patient under observation suffering from venereal diseases in any form, stating the name, character, stage, and duration of the infection, and, if obtainable, the date and source of contracting the same.

"Sec. 2. Physicians shall furnish similar information concerning private patients under their care, except that name and address of the patient shall not be reported.

"Sec. 3. All information and reports in connection with persons suffering from such diseases shall be regarded as absolutely confidential, and shall not be accessible by the public nor shall such records be deemed public records.

"Sec. 4. The State Board of Health shall provide, at the expense of the state, facilities for the free bacteriological examination of discharges for the diagnosis of gonorrhœal infections, and also shall provide, at cost, vaccines or antitoxins for the treatment of such infections. And said board shall make, at the expense of the state, the Wasserman test or examine smears for the diagnosis of syphilis; and shall furnish the treatment known as 'Salvarsan' or other accredited specific treatment at cost. But such diagnosis and treatment shall not be furnished until the data required for the registration of the case has been furnished by the physician or institution treating the patient.

"Sec. 5. The State Board of Health shall include in bulletins

or circulars distributed by it information concerning the diseases covered by this act."

Indiana—"Rule 10 of the rules of the Indiana State Board of Health duly passed as appear in the minutes of the board shall be amended to read as follows, to wit:

"Rule 10—Infectious Diseases. The infectious and contagious diseases which shall be immediately reported to the health officer having jurisdiction and which shall be quarantined are hereby declared to be: yellow fever, smallpox, cholera, diphtheria, membraneous croup, scarlet fever, measles, epidemic poliomyelitis, cerebrospinal fever, typhus fever, bubonic plague, leprosy, pulmonary consumption, typhoid fever, chickenpox, whooping cough, trachoma, syphilis and gonorrhœa; provided pulmonary consumption, typhoid fever, syphilis and gonorrhœa shall not be quarantined, as they are to be reported for record and statistical purposes only."

Michigan—"Venereal diseases. 1. Must be reported to local board of health, but report may be made by number or initials, rather than by the patient's name."

Florida—"Rule 67 of the regulations of the State Board of Health adopted February 27 and 28, 1912 (Public Health Reports, Dec. 6, 1912, page 2041) was amended so as to include 'venereal diseases' in the list of diseases the nature and danger of which are to be explained in literature to be distributed by local health officers and representatives of the State Board of Health."

Kansas—Morbidity reports, Regulation Board of Health, Dec. 13, 1913. "That in the reports of cases of the venereal diseases the name and address of the patient need not be given, and that all such reports of venereal disease shall be made direct to the State board of health on special blank."

Porto Rico—"Sec. 28. That in conformity with the provisions of this act physicians shall report to the nearest health officer any of the following diseases which they may be attending, or may have seen: Exanthematous typhus, typhoid fever, Malta fever, Asiatic cholera, smallpox, varioloid, scarlet fever, diphtheria, bubonic plague, yellow fever, dengue, beriberi, epidemic dysentery, epidemic cerebrospinal meningitis, whooping cough, epidemic parotiditis, filiariasis, tetanus infantum, malaria, tuberculosis, glanders, leprosy, uncinariasis, colibacilosis, infectious pneumonia, malignant putule, and cutaneous syphilis."

Manila—"Public Dance Halls, Communicable Diseases in. Examination of Females:

"Sec. 1. It shall be unlawful for any person to dance in any public dance hall in the City of Manila who has tuberculosis or any dangerous communicable disease.

Sec. 2. It shall be unlawful for any person of the female sex to dance in a public dance hall, whether for a fee or otherwise, without having a valid certificate from the bureau of health showing that such person is free from tuberculosis or other dangerous communicable disease.

"Sec. 3. Such certificate of the bureau of health shall be issued from Station J, Intramuros, only after such examination as may be necessary to determine the state of health of the

person examined, and shall be valid for 30 days only from the date of issue: Provided, however, that all examinations of females required by this section shall be made by a female physician.

"Sec. 4. It shall be unlawful for the owner, proprietor, manager, or person in charge of any public dance hall to allow or permit any female to dance in such public dance hall without having a certificate as required in section 2 of this ordinance.

"Sec. 5. Any person violating any of the provisions of this ordinance shall, upon conviction, be punished by a fine not exceeding 200 pesos or by imprisonment not exceeding six months, or by both such fine and imprisonment, in the discretion of the court."

Montclair, N. J.—Morbidity reports, Venereal diseases. Wasserman Test (Reg. Bd. of H., Jan. 28, 1913):

"*Resolved*, First, That on and after March 1, 1913, the superintendent or other officers in charge of all public institutions, such as hospitals, dispensaries, clinics, homes, asylums, charitable and correctional institutions, including all institutions which are supported in whole or in part by voluntary contributions, be required to report promptly to the board of health the home, sex, age, nationality, race, marital state, and address of every patient under observation suffering from syphilis in every stage, chancroid, or gonorrhœal infection of every kind (including gonorrhœal arthritis), stating the name, character, state, and duration of the infection, and the date and the source of contraction of the inspection, if obtainable.

"Second, That physicians are requested to report promptly all cases of venereal diseases coming under their observation in the future, omitting the name and address, if desired, but always giving the initials for identification in case of duplicate reports, and stating the sex and age of the patient, the name, character, stage, and duration of the infection, and the date and source of the inspection, if obtainable.

"Third, That cases reported by private physicians will be filed by case numbers, which will be given to the physicians for future identification when the cases are acknowledged.

"Fourth, That a supply of report cards be used for this purpose will be forwarded on request. All information will be regarded as absolutely confidential and will not be accessible to the public, nor will the records be deemed public records.

"Fifth, Diagnosis of venereal diseases, That the board of health will hereafter make, without charge, the Wasserman test for the diagnosis of syphilis, and will also provide facilities for the free bacteriological examination of specimens which have been taken for the diagnosis of gonorrhœal infections. The board will also furnish treatment for indigent cases.

"Sixth, The outfits with full directions for obtaining specimens will hereafter be furnished to physicians free of charge at the office of the board of health."

The majority of the ordinances and laws dealing with venereal disease were passed during 1913 and 1914. In 1909 Chicago passed an ordinance requiring that dispensaries should report venereal diseases. This law reads as follows:

Dispensaries.

"Art. VIII, Sec. 1210, second paragraph. It shall be the further duty of such licensee to report weekly to the department of health all cases of consumption, typhoid fever, syphilis, gonorrhœa, with the names and addresses of patients suffering from such diseases or any of them treated or reported to such dispensary."

On Nov. 7, 1914, Health Commissioner Young issued the following statement through the weekly bulletin:

"In execution of duty imposed by Section 1191, and in pursuance of the authority contained in Section 1192, of the Municipal Code, I, as Commissioner of Health, hereby declare that foot and mouth disease, occurring in human beings, is a contagious disease within the meaning of the code, and must therefore be reported to the Commissioner of Health within twenty-four hours after first discovering the existence of such disease."

Section 1191 and 1192 read as follows:

"1191. Isolation, Posting Notice, Penalty. It shall be the duty of the commissioner of health to impose such restrictions upon, and to exercise such supervision over, all persons afflicted or sick with smallpox, scarlet fever, or any contagious or epidemic disease, as shall be necessary to protect from such disease all persons not of necessity connected with any person so afflicted or sick. To aid in securing the isolation of a person afflicted or sick with a contagious or epidemic disease, the commissioner of health may cause a notice, printed or written in large letters, to be placed upon or near any house in which any such person may be, upon which notice shall be written or printed information setting forth the contagious or epidemic nature of the disease. If after any such notice shall be so posted any person shall deface, alter, mutilate or destroy, or tear down such notice, without permission of the commissioner of health, such person shall be fined not less than twenty-five dollars nor more than fifty dollars for each offense, and every occupant of any house or building upon which any such notice shall be so placed or posted as aforesaid shall be held responsible for the removal of the same.

"1192. Physicians to Report. Every physician who shall prescribe for or attend any person having a contagious or epidemic disease, such as cholera, yellow fever, scarlet fever, diphtheria, typhus, typhoid fever, smallpox, varioloid, puerperal fever, membraneous croup, measles, whooping cough, or any of the grades of such diseases, or any other disease designated as contagious or epidemic by the commissioner of health, shall, within twenty-four hours after first discovering the existence of such disease, make a report thereof in writing to the commissioner of health, which report shall give the name, if known, and the place of dwelling of the person having such disease, together with the character and state of his disease. For the purpose of covering the expense of making each such report the physician making the same shall receive the sum of ten cents; provided all

claims for fees for such reports shall be presented before the fifth day of the month succeeding that in which such reports were made."

Acting under the authority of Sections 1191 and 1192, in 1909, the health commissioner of Chicago placarded two houses of prostitution in which there was proof that two groups of school boys had been infected with venereal disease. The placards read: "Syphilis here" and "Gonorrhœa here," respectively. The act of the commissioner was not contested in the courts but out of it there grew the agitation that resulted in the Chicago Vice Commission. The report of this Vice Commission in its chapter on Health Department and Venereal Disease says: "Under the police powers now granted by the state except where specifically limited by statute, the Department of Health could quarantine persons when notified of venereal diseases in them by physicians."

In 1912 the New York City Board of Health passed regulations which, under their basic law, are equivalent to ordinances, requiring that venereal diseases be reported, establishing dispensaries and inaugurating laboratory service for venereal diseases.

These citations prove that the public mind is ready for the control of venereal disease by the municipality and that the time has come for the discussion of such details as the use to be made of the reports, control of patients having venereal disease and methods for the support of venereal disease hospitals.

In olden times officers encouraged the presence of prostitutes with armies. In recent times the policy has been to keep the prostitutes away from armed forces as much as possible. In olden times there was some disposition of municipalities to permit houses of prostitution and red light districts and even to attempt to segregate and regulate them.

This section has twice discussed the subject of regulation of vice. It has been easy to see that the opinion of the section was opposed to it. The section on Preventive Medicine of the American Medical Association has gone on record as opposing segregation and regulation of vice.

One of the recommendations of the Chicago Vice Commission was that a morals commission be established. The city council, in obedience to that recommendation is now considering the following ordinance:

"Section 1. That there shall be and hereby is created in and for the city of Chicago, a commission to be known as the 'Morals Commission of the City of Chicago,' the members of which shall be appointed by the Mayor with the approval of the City Council, and which commission shall consist of five (5) persons who shall be qualified electors of said city and each of whom shall have resided therein at least one year preceding his appointment. The Commissioner of Health of the city of Chicago shall be ex-officio one of the members of said commission. A second member of said commission shall be a physician in good standing.

"Section 2. The members of said commission shall take the oath of office and file the bond provided by

law for officers of said city: Provided that no additional bond shall be required of the member of said commission who shall be the Commissioner of Health of said city. Such bond shall be in the penal sum of One Thousand Dollars ($1,000) and shall be conditioned according to law.

"Section 3. The term of office of the Commissioner of Health as ex-officio member of said commission, shall be during the time that he shall be Commissioner of Health of the city of Chicago. The term of office of the other members of said commission shall be two (2) years and until their successors shall be appointed and qualified. The Commissioner of Health of the city of Chicago shall not receive any additional compensation as a member of said commission. The other members of said commission shall serve without compensation. It shall be the duty of the Commissioner of Public Works of the city of Chicago to furnish to said commission suitable quarters without charge.

"Section 4. The Commission shall have power to appoint according to law at a salary to be fixed by the city council and to appoint according to law such clerical and other assistants as the city council from time to time shall determine.

"Section 5. It shall be the duty of said Commission to study all phases of sexual immorality in its various forms, their causes and effects, and the conditions or practices which tend to promote or restrict them, including all practices which are physically or morally debasing in their effect, or which concern the physical or moral welfare of the inhabitants of the city, with a view to securing both the prevention and correction of such practices and conditions. It shall make a study of the measures necessary to secure the physical and moral rehabilitation of prostitutes, the prevention of prostitution and of venereal disease, of the legal action necessary for the effective suppression of bawdy and disorderly houses, houses of ill-fame or assignation within the city of Chicago and within three miles of the boundaries of said city, and the legal action neeessary for the prosecution of the owners, keepers, inmates and patrons of said houses.

"It shall advise the prosecuting attorney and the general superintendent of police of the results of its investigations and of the occurrence of any violations of any state laws or city ordinances relating to the control of vice or immorality which it discovers. It shall, from time to time, make report of its findings to the mayor of the city of Chicago and the City Council, and recommend the passage of such statutes, ordinances, and methods of procedure as it deems necessary to secure the objects for which it is established, and shall publish such reports as it may deem necessary.

"Section 6. Said commission shall have power and authority to make rules and regulations for the conduct of the business of said commission and otherwise not inconsistent with the provisions of this ordinance.

"Section 7. Nothing in this ordinance shall be so construed as to relieve the general superintendent of police, or or the second deputy super-

intendent of police or any officer of that department, or the prosecuting attorney, of any duties so imposed upon them or any of them by the ordinances of the city of Chicago and it shall be the duty of all heads of the various departments of the city government and the employes of same to coöperate fully with the Morals Commission of the city of Chicago and to supply it with all information and statistics in their possession.

"SECTION 8. The ordinance shall be in full force and effect from and after its passage and publication."

This ordinance recognizes as a principle that the problems of prostitution are largely medical and builds the control of morals around health rather than the police department.

The figures from many sources such as the St. Charles School for Girls and the Morals Court of Chicago (a court proposed by the Vice Commission) show that about 85 per cent. of professional prostitutes are shown to be definitely mentally sub-normal on the Binet-Simon scale.

The principal cause of prostitution is medical. The principal methods of cure are medical. Prostitution further relates itself to the health department through its relation to the spread of venereal diseases.

There is wisdom in building the Morals Commission around the Health Department.

Discussion.

DR. W. F. SNOW (*New York City*): As doubtless most of you know, I have become individually so much interested in the possibilities of carrying out such a program administratively as Doctor Evans has laid down, that I am now giving my whole time to a clearing house for information of this character, in the position of General Secretary of the American Social Hygiene Association. I do not think anything that any of us could say would more clearly present the gist of the proposition than this brief paper of Doctor Evans. There are now some nine states that have made venereal diseases reportable. There are perhaps nine or ten cities that have made these diseases reportable independently of the state regulation and are following it up with active administrative measures such as have been mentioned here. Doctor Evans has not mentioned, as he stated at the outset, any of the indirect influences that are gradually changing public sentiment and making it possible for the health officer actively to take this up as a preventive medicine problem. After a study now of some six months of the situation over the country, I am more convinced than ever that we have a clear-cut administrative program which has of course many difficulties before it, but which can be carried out. I would like, if it is in order, to present a resolution which I hope will be adopted at the end of the discussion:

"WHEREAS, venereal diseases are a serious and prevalent cause of ill health and suffering among the people of all parts of the country, and

"WHEREAS, scientific knowledge shows these diseases to be preventable, therefore be it

"*Resolved*, That a Committee of this Section be appointed to study and report upon the standardization of administrative measures for reducing the prevalence of venereal diseases and promoting their ultimate eradication."

In explanation I would say this, that study of these plans which are now being launched shows there is very great opportunity to bring together these administrative measures upon a common ground, and I believe there is no organization like this of the American Public Health Association to sanely and effectively study the measures that are being attempted and perhaps to suggest new measures that are more practical.

DR. HAVEN EMERSON (*New York City*): Doc-

tor Evans has said that the city of New York is likely to become involved in the administrative control of dispensaries for the treatment of these diseases. I think it may be questioned whether that is to be adopted by the city until it has been proved that the existing dispensaries are not capable of handling the situation. There are many advantages in spreading the knowledge of the public health attitude among the physicians at dispensaries who have the responsibility for the care of the indigent sick, and if the city assumes this as an administrative function, we will at the same time antagonize a great many physicians and lose the benefit of the educational propaganda we must spread largely through the physicians.

There is at present in New York City an association of venereal disease dispensaries organized in a similar way to tuberculosis dispensaries. They are doing their best to come up to the standards of treatment that we think should be adopted. There are many that lack the dark field microscope, many that lack the means for making the complement-fixation or the Wassermann test, and still more that are unable to carry out up-to-date or efficient treatment. Yet the cost of having the city administer these dispensaries would be enormous and would meet with tremendous opposition. The organized physicians are definitely against having any such work taken on by the city. It is accepted that the function of the city department as to notification and diagnosis can have the widest range, but when it comes to assuming treatment of these diseases, there is unanimous disapproval, and I think it would be fair to say that until it has been proved that the dispensaries, either associated with hospitals or others, are unable to accomplish proper treatment of the patients that apply to them, it should not be assumed as one of the functions of the city department of health.

There is one other side of this, that physicians throughout the country must take upon their shoulders. The quack is an expression of a sore spot on the medical practice. The medical practice act gives the licensing board of the state very large control that they declined to assume or exert. It is almost impossible to eliminate the quacks until the professional bodies, county societies and organizations and state societies, take up the job of cleaning their own house. We have been doing our best to detect and convict the people practising illegitimately and our plan has been this, that detectives who have been tested on the day of their visit to these quacks for gonococcus, etc., have had complete physical examination, have then gone to these offices, have been subjected to a so-called X-ray examination, they have been told they had syphilis, that gonorrhea was in their blood, that it could be seen by the X-ray and treatment was recommended for them. They returned and were tested by the Wassermann test and then cases were brought before the magistrate with the result that in no case have we found that the same physician examined any two of the detectives since. There is a large body of people examining people in New York who have no license to practise, and the county society is the one whose burden it is to clean the city of those people. The department of health of the city does not control the medical practice of physicians as it does that of midwives.

Then there is one further question I should like to state. After you have got a case reported, what are you going to do about it? We are getting a great many reports from institutions and a few from physicians. We shall expect to get more, but after you have got a case reported, what are you going to do? Are you going to placard the house? Are you going to quarantine the individual? What are you going to do with your patient when you have got him reported? As far as I can see, this reporting of venereal diseases amounts simply to stating that we know how many there are; don't know where they are, can't keep them located, can't deny them the privilege of free movement throughout the community; unless we have some control to be maintained, I fail to see yet what the direct, practical result in diminishing disease is going to be except through our opportunity of education. I heartily agree with the program that Doctor Evans has proposed. I doubt whether we are doing all we can with existing powers at our disposal, and I should advise not insisting upon the department of health dispensaries, until the existing dispensaries are able to do their work.

Doctor Fronczak (*Buffalo*): Doctor Evans has given me the honor of quoting extensively from our recent bulletin on venereal diseases. Buffalo is complying with the pro-

gram Doctor Evans has just announced. For the past year or so we have made Wassermann examinations, about 160 every week, of which we find 30 per cent. to 40 per cent. double plus. Those unable to afford hospital treatment are sent to a hospital for two days and the salvarsan administered at the expense of the city. We also make free examination of gonococcus smears. During the past ten months 3,500 of these were sent to us, of which 90 per cent. proved to be positive. Two weeks ago the health department of the city of Buffalo opened a gynecological hospital where we treat venereal diseases, gonorrhea and syphilis and also any disease of the genito-urinary glands, both indoor and outdoor departments.

There is a rule of the department whereby every physician, hospital and dispensary must report venereal disease. We have some trouble with the physicians in private practice reporting, and on the whole I do not believe that we get more than 20 per cent. of these cases reported, but we get a fairly complete report from the various hospitals and dispensaries.

We are distributing now, among high school boys especially, circulars describing the dangers of venereal diseases and we are distributing circulars among the public warning against quacks in the profession. I believe the chief danger is that we have in our profession quite a number of men who are quacks, who are doing everything in their power, as Doctor Emerson just said, to scare men by saying they have syphilis or gonorrhea when they haven't it, and many of the physicians in the profession are members of our great Association. There are certain members of our county society—and they may rave at the meetings against this very thing—who are doing it right along. It will be very necessary for us to clean house among ourselves before we can proceed to clean house among physicians who are not members of the various societies and associations. On the whole I believe that the time is coming when the people at large will take an interest in this subject. You remember the general objection when it was first proposed to report tuberculosis. I believe the time is coming, and coming within five years, when we will have as general reports for venereal diseases as we have for tuberculosis.

Mr. Lawrence Veiller: I think I can suggest a method by which we can go a little faster than the five year time that Doctor Fronczak has suggested and also get an answer to the question, "What can we do with reported cases?" I want to suggest to the health officers that they seize this opportunity by coöperation with the head of their correctional and charitable institutions and inaugurate a system of examination of every man and woman in every charitable and correctional institution run by the city or state and then treatment for their cure. That will take a very large number of people who are suffering from venereal disease. Our Commissioner of Correction in New York has recently caused an examination to be made of the inmates of one institution and found, with regard to the women that over 70 per cent. are infected with venereal disease, and with regard to the men, over 40 per cent. It seems to me that it is perfectly feasible for every health officer throughout the United States, either state or local, to work for legislation which will compel this kind of examination of the wards of the state, or, without seeking legislation, through mere coöperation with the heads of those institutions, to bring about not only these examinations but their subsequent treatment.

Dr. J. H. Landis (*Cincinnati*): I do not believe there can be any special debate on the measures advocated in Doctor Evans' paper. The educational measures, the reportive cases and the treatment of clinics and hospitals. That same process has been followed in the attempt to curtail the number of cases of tuberculosis and typhoid fever. The educational propaganda in Cincinnati as to the boiling of water and the use of filters in private houses was carried on for a number of years. The cases were treated in the hospitals, and still we had a mortality rate of about 80 per 100,000 of population, until we purified the source of the trouble, when our death-rate fell to 25.7 per 100,000. I cannot see how these measures advocated are going to reach the source of the venereal trouble. It is a well-known fact that the houses of prostitution are the distributing centers for gonorrhea and syphilis. Now just the moment that any one advocates the examination of prostitutes, he gets into trouble. He gets into trouble, as a rule, in bodies of this character, and he certainly gets into trouble in his home town. I can see no reason in the world why gonorrhea and syphilis should not be placed on an absolute

level with smallpox and the plague. The fact that you go out and examine prostitutes and isolate those in a hospital that you find diseased is exactly on a par with your method of treating cases of smallpox or the plague. In Cincinnati, as I suppose happens in a large number of cities, there are a number of private physicians who are in the habit of writing certificates of health for prostitutes. We have followed up the work of these physicians for several years, and in Cincinnati we have found prostitutes carrying on their occupation with certificates of health in their possession that had been written within forty-eight hours of the time of our inspection, signed by a physician supposed to be reputable, and in which he stated that the prostitute was free from venereal disease, and at that very time he was treating the prostitute for venereal disease. We have made three surveys in Cincinnati within about a year and a half. On the first survey, as I recall it, out of about 263 examined we sent 43 to the venereal ward of the Cincinnati Hospital. Another inspection was made in the course of six months and a third in the course of another six months. Now the reports that we received from the specialists in venereal diseases and from the hospitals and clinics following those inspections there, showed that there was a decided falling off in the number of such cases of venereal diseases presenting themselves for treatment, and the physicians in one of the hospitals complained that the number of cases had been cut down to such an extent that it was almost impossible to carry on a good clinic in that hospital. That immediately brings up the question of segregation. Any man who advocates segregation immediately gets into trouble, and yet if you treated smallpox as you are treating the prostitutes or as people advocate treating the prostitute, you would scatter smallpox over an entire community. If you handled the criminal classes as the majority of people want these prostitutes, you would scatter your criminals over an entire community. I believe that every city should go at this question along the lines advocated by Doctor Evans, but I do not believe that any city that stops there is going far enough. I believe that these cases should be hunted out. The police know where the prostitutes are located. I believe that the department of health should go down to those places, examine those inmates and isolate in hospitals all found with a venereal disease.

Doctor Burkhardt (*Michigan*): I think possibly the most potential factor in this house-cleaning process has been overlooked; and that is the public press. Coming from Michigan, where such cases are reported, and which has been the dumping ground for all classes from all states for all time to come, we had not been able to accomplish anything until we enlisted the public press. The K & K Fund, with over $3,000,000, defied every state and city official until the public press took it up. The little state started the ball rolling; the *Times* and the other publications set it going, then the *Detroit News* took it up and from the *News* it went to the *Free Press* and the *Journal;* they refused the advertisements of those gentlemen, started a very vigorous campaign and got the law started in the proper direction, and as a consequence the K & K people served a term in jail, one of them and the other is a refugee. They are out of business and nearly all the quack institutes of Michigan are now on the run. We never would have accomplished it had it not been for the influence of the press. Venereal diseases in Michigan are not reported. I can safely say that only three physicians in the entire state have reported to me a single case of disease, and when they do they are reported by number and I am no wiser. Set the press going and you will eliminate your quacks, but we cannot eliminate the most pernicious influence, the counter-prescribing druggist.

Dr. P. S. Schenck (*Norfolk, Va.*): I want to say just a word too along the practical side of this question. I admit all that Doctor Landis has said about a man attempting to do much along this line, that he will get into trouble, and I am one of those men who has been in trouble on account of this question. Nevertheless I am pushing it just the same. In 1910 the surgeon-general of the United States Navy appointed a commission to examine into the venereal disease question at the seaports. This commission reported that the sailors who went out of Norfolk were more heavily infected with venereal diseases than from any other seaport that the United States ships visited. So prevalent were those diseases among the United States naval vessels, that this committee recommended that

no shore leave be granted to the enlisted men in the city of Norfolk, and that meant a deprivation to the merchants of $6,000,000 or $8,000,000 a year. The Chamber of Commerce and our Board of Trade took the matter up and appealed to the health department to relieve the situation if possible. I decided that I would attempt to do something and appointed four physicians, and since that time we have had a regular, systematic investigation in the segregated districts. With the morals of this I have nothing to do, but, as health officer, the prevention of these diseases has been my sole aim. Right across the river from Norfolk we have a trading station known as St. Helena. Their records are accurate. Any infected sailor has to report at sick bay any infection they may have and have to go through the same routine as to laying themselves open to infection as they do in the army, but they have to report at the sick bay in the United States Navy; if they don't do it, they are fined 60 days pay and put in the brig on bread and water; for 60 days they kept that record and the statistics of St. Helena Station showed they had on an average of 200 venereal infections at all times distributed among these three to five thousand people. We have been working jointly. They keep us posted. I have a bulletin put up in the sick bay of the houses we find infected and the names of the women. When one of their men is infected and applies at the sick bay, they send him over with an orderly. I send him with a physician to the house, the sailor identifies the woman, we examine her and if she is infected we take her out and treat her. From an average of 200 at all times for the past two years they have had less than 20 infections among those men patronizing the same sources, and I say it is fair to assume that if the house of prostitution is the fountain head for the distribution of venereal diseases, while, as Doctor Evans said, you cannot corral the man about town, it is fair to assume that if you can get statistics from the navy as I have described, the same thing would apply to the man about town patronizing the same sources of infection.

Dr. Chas. J. Hasting (*Toronto*): It seems that Doctor Emerson was wise in suggesting our not going too far in the solution of this problem. We have been living in a fool's paradise and I think it would be unfortunate if we fall victims to allowing the pendulum to swing from one extreme to the other. This is largely a matter of education. We have to go slowly. The question was raised in regard to hospitals, venereal hospitals. The Royal Commission that was appointed in Great Britain to make investigations along this line—their ruling and the consensus of opinion of that Commission was that it was not wise to have venereal hospitals or hospitals for venereal diseases, but to insist that all public hospitals take in and treat the venereal diseases. As soon as you stigmatize a hospital as a venereal disease hospital, then you label every person that goes in there and only encourage the secreting and concealing of cases, which really, in my judgment, defeats what we are trying to do, that is to encourage the reporting of the cases. Doctor Landis pointed out the extreme frequency of these cases in connection with houses of prostitution. I think in all cities where investigations have been made, both in Europe and on the Continent of America, it has been found there is a larger percentage of venereally-infected prostitutes among the clandestine prostitutes than among those in the houses, therefore we have got to go a little further than the houses of prostitution. Now then, in regard to the social side of it which Mr. Vieller wisely pointed out, I think that is extremely important. We are endeavoring to do that as fast as possible in Toronto. In all institutions receiving contributions from the city and handling indigent patients and indigent people generally, those institutions are required to investigate in regard to venereal diseases in them and see that they are treated. Under the Public Health Act we have got power to hold them in quarantine, inasmuch as they are suffering from a communicable disease that is prejudicial to public health. This is an intensely interesting problem that in our over-enthusiasm, waking up after so many years slumbering over this, it behooves us not to try to go too far, but we should go cautiously. Be sure you are right, then go ahead. We will now call on Doctor Evans to close the discussion.

Dr. W. A. Evans (*Chicago*): I want to second the motion made by Doctor Snow in offering his resolutions to provide for a committee to investigate this question. In that part of the paper which was not read I gave a considerable number

of state laws and ordinances that have been adopted in different parts of the country. Those laws and ordinances generally speaking are merely empowering laws, they do not discuss in detail, they do not establish the details for these campaigns. These laws generally have been passed within the last two years and coming from all parts of this country, to my mind it means quite clearly that public sentiment has been created strong enough to make it possible to pass laws. The time has come for health officers to do something. Preliminary, however, to activities on their part, there should be a period of study. That is provided for by this resolution offered by Doctor Snow. It is easily possible under these laws and ordinances, for they do not go into detail as to what shall be done. I did not give you the figures that are contained in my paper. They show that in the United States Army and the United States Navy the amount of venereal diseases within the last ten years has been cut just about in half. The reduction in foreign armies has been still greater and therefore it seems to me that in beginning our consideration of the subject, we should begin by giving careful consideration to the measures that have proven their efficacy when applied to armies and navies. At first we are made aware of the fact that many of the things that are possible in an army or in a military arm, are not possible in a free community. Therefore the first thing for us to decide is which of these measures can be applied to conditions in our communities and the next thing to decide is how shall they be applied? For instance, let us take this matter of the establishment of dispensaries. I believe that the New York Health Department, when they began their dispensaries, had in mind complete dispensary work; but they met with this opposition from the medical profession, so that they adopted a certain line of dispensary work that does not represent the full work usually done by dispensaries. I do not believe that there will be any immediate change in the sphere of activities of the New York dispensaries. I think that it will be a very good idea if other communities inaugurating venereal dispensaries would lessen the opposition by working along these somewhat limited lines. There is nothing to be gained by predicting what the future will hold. There is nothing to be gained really by prophesying what the future will hold. Start your dispensary along the lines that it was proven wise to start the New York dispensaries, and let the future work itself out. The same thing holds true, largely, of hospitals. I agree with Doctor Hastings and the conclusions of the Commission that venereal disease hospitals, labeled as such, will meet with serious discouragement, will labor under serious disadvantages. A better plan to pursue will be to strive toward a certain amount of hospital capacity for venereal disease cases in your community and allow the distribution of those beds to work itself out in the course of time. I have a paper on the subject of quacks and advertisements and advertising agencies and newspapers in relation thereto. It comes before the General Session a day or two later. I believe we have but two quacks left in the city of Chicago at the present time. They are not advertising; they cannot advertise in the papers. In my judgment, however, that does not reach the difficulty. The cure for quacks is more public information. Your New York Medical Society, Doctor Emerson, will not control the situation and no other legislative agency will put the quack out of business. The quack will go out of business when the people have enough of information so that they can form accurate opinions as to the offerings of medical men. When that information is generalized, the man that cannot meet the requirements will go out of business, will be forced out of business by economic considerations. He will not be forced out of business until such economic considerations operate. You gentlemen can easily remember when there were advertising doctors who advertised to cure a great multitude of ailments pertaining to, let us say, every part of the body. The limits of operation of these gentlemen have been circumscribed year by year until at the present time practically no quack is left except the quack who is practising on venereal diseases and those conditions that are closely allied thereto. And why? The quack was forced out of the consumption cure business when the people became educated as to consumption; he was forced out of the women's disease business when there was education along those lines; out of the Bright's Disease business when the people understood Bright's disease;

and when we have educated the people in relation to venereal diseases so that the man of the street can form accurate opinions as to the qualifications of those who make promises or offer guarantees, then and not until then will there be an end to the quack business.

Doctor Hurty: You lay great stress upon education; haven't you known doctors and medical students with these diseases, in spite of all their education?

Doctor Evans: Yes, sir.

Dr. Hurty: Then sometimes it fails.

Doctor Evans: There isn't any question about that.

Doctor Hurty: I would like to hear you discuss what effect the inculcation of virtue would have upon this disease.

Doctor Evans: Now I would take your time to discuss that if it were not for the fact that it has been discussed, I believe, very much better than I can discuss it, and I believe that it would be possible for those who are interested to get the documents in which it has been discussed. There is The Venereal Problem in the Army and Navy by Lieutenant-Colonel Kane, and the Judgment of Paris, by Lieutenant-Colonel Kean, issued by the medical department of the United States Army, which talks at length along that line and much better than I can discuss it, quoting particularly the views founded on the broad experience of the man who is a professional moralist, let us say, the present General in charge of the British Army—Kitchener's statement and Kitchener's argument and Kitchener's plea for morality would be more effective than any I could utter. Now about this matter of reporting cases, that is a very practical problem and I am sure it has weight with us. What are you going to do with the cases when you get them reported? That question is to be answered in several different ways. First what can be done tomorrow with the existing public sentiment, with the cases that are reported? The answer to that question will have to be based upon the circumstances that relate to that case. In the first place, you will find certain groups of people in such position that they can infect the maximum number of people, and for them there should be some action based upon that report. I refer particularly to infected prostitutes. Doctor Landis has spoken of one thing that might be done with them; Doctor Schenck of another, and I told you in my paper what we did with some of them a few years ago in Chicago. Public sentiment would justify us, in justifying certain communities in taking certain action with relation to that group. About three or four years ago it was the municipal policy in Denver, a very well thought out policy under the superintendent of police. Of course there still remains the very large group of people infected with venereal diseases who cannot be handled, in the present state of public opinion, as we now handle a man who, let us say, has smallpox. But let us see if there is any reason why we should not insist upon reporting, merely because we have not now nor do we see in prospect, a solution of the question of what is to be done with the reportable case? When we have the question of reporting come into our minds, we are liable to think at once of those conditions in which the word "report" is practically synonymous with the words, "complete control." For instance, yellow fever or smallpox or cholera. We lose sight of the fact that we, at the present time, require reporting of a considerable number of diseases, as to the further details of the handling of which we have not any particular unanimity of opinion in our action. For instance, measles—most communities require the reporting of measles; many communities get a fair percentage of their cases of measles reported. What do they do with the cases that are reported? That, as you know, is a very live question in England. Their policy differs radically from our policy by reason of the fact that they are not of an opinion as to what shall be done. I might go on, but I will cite just one and that is tuberculosis; what do we do with a case of ambulant tuberculosis that is reported? And yet there isn't any question at all but that we began our control of the tuberculosis situation by our provisions that demanded that the cases be reported, although when those ordinances were passed, were put in vogue, none of us had any idea as to what could be done or should be done with the cases of tuberculosis reported. A little while ago I heard the assistant corporation counsel of the city of Chicago say that venereal disease could not be made a reportable disease because it was not communicable, that it was not infectious,

that it was not contagious. If we do not do anything else by reporting these diseases, we will bring this group of cases out into the limelight, precipitate a discussion and out of that will come a method of improving the situation a little here, another little yonder and another yonder, and perhaps sometime or other we will have complete control of the situation. Now gentlemen, I desire to second the resolution offered by Doctor Snow because these ordinances and laws that have been passed—my general knowledge of the subject is quite convincing that we do need careful study and we do need standards of procedure.

Dr. C. J. Hastings: There are two distinct phases of this problem; there is the social and the moral side of it, as has been pointed out, and then there is the communicable disease side. Now, in my humble judgment, if departments of health hope to efficiently handle this problem, they must absolutely divorce the preventive disease side of it from the moral and social aspect of it; there are other organizations that must handle it. If we begin by inquiring where and how you contracted every case and place emphasis on the social and moral side of it, we are going to defeat the very object we are trying to accomplish, so I think that it is extremely important. In connection with the Department of Health in Toronto, in all our general hospitals, we require them to have the cases of venereal diseases carefully handled and looked after. The Board of Health has been glad to supply their share, at least, of the cost of the salvarsan treatment of all these cases. I think we have got to go slowly and be absolutely sure of every step we take.

Doctor Snow's resolution was adopted.

A PORTABLE AIR SAMPLING APPARATUS FOR THE COLLECTION OF LARGE VOLUMES.

E. W. Brown,
P. A. Surgeon, United States Navy.

THE apparatus here described has been designed for the rapid collection in duplicate of relatively large volumes of air to be examined in the laboratory for such gases as carbon monoxide, hydrogen sulphide, oxides of nitrogen, etc. Minute amounts of these gases are of hygienic significance and the standard methods of analysis require the aspiration of large quantities of such air through appropriate absorbents. It is not practicable as a rule to make the analysis on the spot, particularly if the air is rapidly changing in composition, owing to the time required for aspiration and the special apparatus necessary to complete the analysis. A situation might arise, for example, in a sewer, in an engine-room or after gun-fire in a turret aboard ship when it is imperative to take large samples speedily, so that a representative portion within a short-time interval may be obtained. The advantages of collection in duplicate are obvious. The present apparatus is designed to fulfil such requirements.

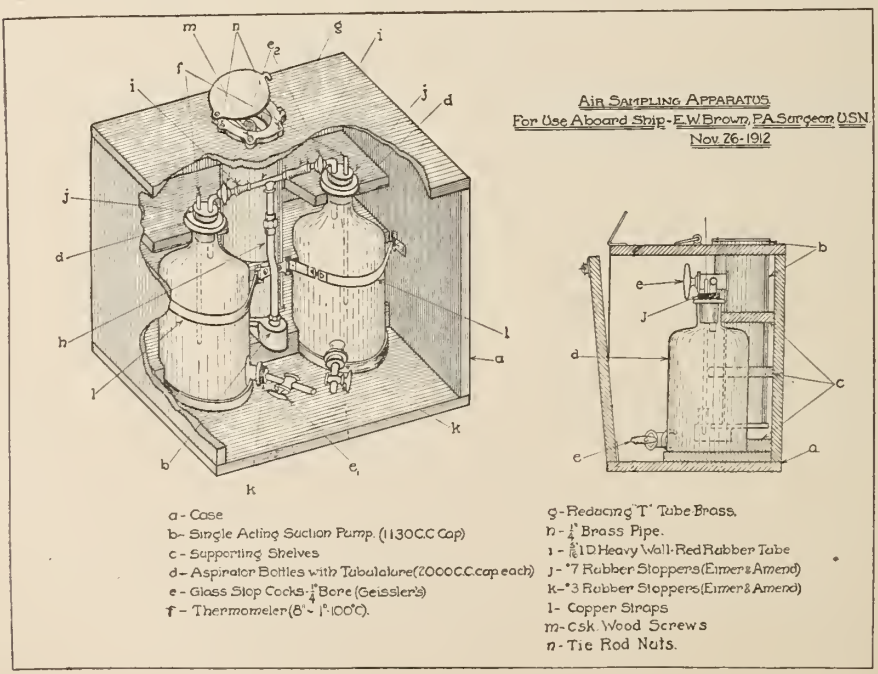
The apparatus is portable, protected against breakage under shipment, and air-tight. It consists of a wooden case 17 inches long, 12 inches deep and $14\frac{1}{2}$ inches high, enclosing two glass bottles each of 2,000 cc. capacity, with gas-tight glass stopcocks, and fitted with a standard thermometer. The bottles are connected by glass and metal tubes with the inlet of a brass suction pump of special design. The writer has determined on the basis of a large number of tests that each stroke of the suction pump draws about 800 cc. of air through the two bottles at the rate of about 1 stroke per second. This was observed by connecting the two lower stopcocks to a gas holder and exhausting a definite quantity of air from the latter through the bottles with the pump. The course of the air in sampling is as follows: Through stopcocks e 1 to bottles, through stopcocks e 2 to the reducing T-tube g to h and to pump. The bottlers rest on felt pads and are held firmly in place by copper straps encased in felt. The rubber stoppers are carefully wired in place. The pump is readily accessible for interior inspection. There is an outside carrying case provided for shipment not shown in the sketch. This has a protective arrangement of springs at the bottom and also on the under side of the cover; the sides, cover and bottom are covered with very heavy felt padding. The inside case is therefore guarded against sudden jar in handling and no further packing material is needed. Thorough tests for tightness were made. There may of course be marked changes in pressure of the contained sample as a result of temperature variations; thus, a drop from 70 F. to 32 F. would entail a fall

in pressure of over 2 inches of mercury. The apparatus remained perfectly tight under a positive and negative pressure of 6 inches of mercury which is far in excess of any possible fluctuation.

Directions for sampling: Open stopcocks e 1 and e 2, give 20 strokes to the pump and close all stopcocks securely. If it is desired to sample from a place where it is impracticable to place the instrument, carry rubber tubing connections from stopcocks e 1 to the location specified.

Precautions: Securely wire all stoppers to tubulatures of bottles; lubricate all stopcocks and secure with rubber bands; wire all rubber tubing connections; inspect interior of the pump from time to time as to condition of valves.

The following question arises: How many strokes of the pump are necessary to obtain a representative sample of air? The combined volume of the two bottles is 4,000 cc. and the air displacement of the pump is 800 cc; thus in five strokes, 4,000 cc. of air would pass through the apparatus, but the sample would still be contaminated by a small residual portion of the original air. This question was tested by the following procedure: The sampling bottles were connected through stopcocks e 1 by rubber tubing of $\frac{1}{4}$ inch internal diameter with two openings into the interior of an air-tight respiration chamber of 300 feet capacity, the CO_2 content of which had been previously determined by a Haldane Gas Analysis Apparatus. A sample was then drawn from the



chamber into the two bottles using a definite number of strokes with the pump, the stopcocks then closed and CO_2 estimated in each bottle by the Haldane Apparatus. The CO_2 percentage of the room and the number of strokes of the pump were varied from time to time. The data in the following table are typical of the results obtained. Each percentage represents an average of three analyses agreeing within .02 per cent.

It is concluded from the accompanying figures, that a minimum of 15 strokes of the pump are required to obtain representative sample; but 20 to 25 strokes are recommended to allow a proper margin of safety.

Air-tight room avg. CO_2 per cent.	Bottle 1 avg. CO_2 per cent.	Bottle 2 avg. CO_2 per cent.	No. strokes of pump.
.78	.73	.74	10
.24	.18	.20	10
.24	.20	.20	10
.26	.20	.21	10
.26	.19	.20	10
.52	.47	.45	10
.80	.81	.79	15
.57	.56	.56	15
.23	.21	.21	15
.24	.23	.22	15
.27	.25	.24	15
.24	.22	.23	15
.25	.25	.27	15
.27	.26	.25	15
.25	.25	.25	15

REFUSE DISPOSAL IN SOUTHERN CITIES WITH PARTICULAR REFERENCE TO SAVANNAH, GA., AND ITS NEW INCINERATOR.

E. R. Conant,
Chief Engineer, Savannah, Ga.

Read before the Laboratory Section, American Public Health Association, American Publication, Jacksonville, Fla. December 2, 1914.

THE production of waste is the result of living. This being true of the individual, is also applicable to communities. In small villages no difficulty is encountered in getting rid of the limited amount of refuse or waste that is thrown off. In congested communities it is a difficult problem, and the increasing demand for sanitary and efficient methods of disposing of waste is arousing intense interest. Public health is looked after more at this time than ever before, and anything that will eliminate the origin or spread of disease is immediately grasped at.

Waste disposal in the past has been, and in many cities is at the present time, carried on in a primitive manner. Consider for a moment the unsanitary, unsightly and objectionable refuse dumps, which are found on the outskirts of many of our cities. Those who have observed the familiar turkey buzzard hovering over a dump and devouring the putrid matter of same can speak of the unsanitary method of disposing of refuse by placing same in dump piles. These garbage dumps breed multitudes of the pest known as the household fly. Eminent medical men, at one time, advanced the theory that the continued dumping of refuse on lands adjacent to some South American cities was the cause of the frequent yellow fever epidemics and it is a fact that after the yellow fever epidemic in Florida in 1888, six southern cities in Florida and Georgia constructed what was then termed crematories, anticipating the destroying of refuse by these plants to be done in a sanitary manner. Again the refuse pile is the habitation of rats, the elimination of which, at this time, receives much attention. These garbage dumps located at one time outside of the city limits, may later on be the site for residential sections of the city, and the writer has in mind a city in Georgia, where a portion of the best residential section is located, which at one time was the dumping ground for the city's refuse, and only recently a fire occurring in a portion of the area gave much concern to some of the residents near by on account of the odor and smoke coming from same. Fire in a refuse dump can burn for a long period of time, and the discarded refuse dump at Savannah has been on fire continuously for two or three years, and is still burning.

Character of Refuse of Southern Cities.

The character of waste collected in southern cities differs materially from

that of cities in colder climates. The garbage of the South contains a very much larger percentage of vegetable matter than is found in northern cities. In Savannah, during the months of July and August of this year, an average of twenty tons of watermelon rinds were collected daily, which was 20 per cent. of the total weight of garbage and rubbish collected.

Far less meat is consumed in southern cities than in the North, with the result of a less percentage of grease to be found in the garbage than is found in garbage of colder climates. Of the total weight of garbage and rubbish collected in southern cities from 40 to 45 per cent. in weight is strictly garbage. In northern cities it is only from 12 to 15 per cent.

Rubbish is combustible to a large extent, and is partly used in the North for kindling fires and for fuel to a far greater extent than it is in the South, as a result the percentage of rubbish, while only 20 per cent. of the total amount of refuse collected in northern cities, is from 45 to 50 per cent. of the refuse collected in southern cities.

Ashes constitute from 70 to 80 per cent. of the total amount of refuse collected in the northern cities, whereas in the South it varies from 6 to 20 per cent. according to the location of the city in question.

Method of Refuse Disposal Adaptable to the South.

With the wide difference in the character of refuse found in a warm climate with that found in a colder one, it is to be expected that methods adaptable to the former would not be adaptable to the latter.

The reduction system in vogue in many of the northern cities, in the writer's opinion, cannot at the present time be made profitable and satisfactory in the South.

In the first place, the percentage of grease found in the garbage of the southern cities, as stated above, is far less than it is in the garbage of the North, and from reliable information received, the percentage of grease found in the garbage of the southern cities does not exceed 3 per cent. of the total weight of the household garbage, which percentage is too little to permit of the reduction system being carried on with profit.

In the second place, the reduction system requires a strictly separate collection of kitchen garbage, which at this time appears to be impracticable, on account of the non-dependable type of the household servants, which is almost exclusively colored.

Further, the reduction system requires expensive machinery and the operating cost is heavy, and with a large amount of refuse collected other provisions would have to be made for disposing of same.

In some cities of the North a large portion of the garbage is disposed of by feeding same to the swine, and while possibly this may be made sanitary and satisfactory under certain conditions, it cannot generally be followed, and is impracticable to be followed in the South, for the reason that it is impracticable to collect the garbage separately so as not to contain rubbish or ashes, and in the second

place in a warm climate the garbage decomposes and sours too rapidly for use as a food to hogs.

With the amount of rubbish in the refuse of southern cities, burning same gives a corresponding greater fuel value than is found in the refuse of the North, and with the modern types of incinerators or destructor plants, the burning of the garbage, rubbish and ashes intermixed without the addition of fuel is capable of evaporating water to the extent of from 1.3 pounds to 2 pounds from and at 212 degrees F. for every pound of refuse burned; thus it is seen that with proper plant a valuable biproduct, steam, can be obtained from destroying the city's waste by incineration and at the same time the refuse is destroyed in a sanitary and unobjectionable manner. This method of disposing of refuse at this time, especially in southern cities, is, in the writer's opinion, the most practical, most sanitary and least objectionable of any method now in progress.

I repeat that at this time, for we all recognize the fact, that this is a period of waste by the American people. Anyone who has closely inspected the refuse collected, observes waste that has occurred at the origin of the production of same. The time will undoubtedly come when the character of the waste of the American City will be different and conditions may call for different methods of disposal.

Method of Disposal now in Progress.

In order to ascertain the present method of refuse disposal in southern cities, letters of inquiries were sent out to the principal municipalities and thirty-nine replies were received. The questions asked were:

First: Population of city.

Second: Method of disposing of the city's refuse of the following classes: Garbage, rubbish, street sweepings, ashes.

Third: Have you in operation any crematory or refuse destructor. If so, please give type.

Fourth: Capacity of same.

Fifth: Which class of refuse does it destroy.

Sixth: Do you contemplate changing your method of refuse disposal.

These replies are incorporated in the tabulation attached.

Analyzing the information received, it is observed that three cities, Atlanta, Georgia, Montgomery, Alabama, and Savannah, Georgia, have in operation high temperature destructors of the Heenan-Froude type, all of which are so equipped as to furnish steam by the burning of refuse without the use of additional fuel.

Two cities have crematories of the Dixon type; five garbage incinerators of the Nye Odorless type; one with incinerator built by the city, type not mentioned; three with crematories, type not given and one with a gas furnace using natural gas.

Ten cities report that they are either constructing or contemplating the adoption of method of refuse disposal by incineration.

The method of disposing of each class of refuse is reported to be, as follows:

Garbage: Eleven cities place same in dumps; one has a reduction system;

one feed same to hogs; three burn same; eleven dispose of same with incinerators or crematory plants and two fail to report final disposition.

Rubbish: Thirteen dispose of same in incinerator or crematory plants; eleven dispose of same by placing in dumps; three burn same in open fires and two do not mention method of disposal.

Street Sweepings: Twelve cities dispose of same for fertilizer use; five burn same in incinerators or crematories; one dump the sweepings in river; nine dispose of same in dumps and three do not mention method of disposal.

Ashes: Two cities report that their ashes are burned in incinerators; the others dispose of same by filling holes in streets or raising streets or lanes or by placing same in dumps.

From the above analysis of the disposal of refuse in southern cities it is observed that the South is alive to the importance of the disposal of refuse in a sanitary manner, and while many of them have to adopt modern methods of refuse disposal, yet, I doubt if the proportion of cities in the South not employing sanitary methods is any greater than it is in any other section of the country. Those replies are tabulated on pages 915, 916 and 917.

Type of Refuse Collected, Method of Collection and Method of Disposal of same at Savannah, Georgia.

The population of Savannah is estimated at 80,000, of which practically one half is colored. The city occupies an area of approximately seven and one-half square miles. The streets are laid out in rectangular form, with a complete system of lanes, which provide for delivery to households and for the carrying away of waste. The city is comparatively flat, with forty-five miles of paved streets and lanes. The refuse of the city consists of: Garbage, rubbish, ashes, dead animals, street sweepings, sweepings from catch basins, night soil, sweepings from stables.

Rubbish and kitchen garbage is allowed to be placed in one receptacle and one combined collection is made of same.

Ashes must be placed in separate receptacles.

About 80 per cent. of the populated section of the city receives a daily collection of garbage and rubbish; the remainder every other day, with the exception of the extreme outlying districts, which receive bi-weekly collections.

The total annual amount of garbage and rubbish collected is 27,200 tons, of which approximately 12,500 tons are strictly garbage, which is approximately one pound per inhabitant per day. The cost of collecting and delivering same to the destructor plant is $2.29 per ton. This includes the maintenance of the teams and stock, the feed of stock, labor and new stock purchased during the year.

The question of the collection of ashes is of rather small moment. In winter time the daily collection would vary from 3 to 8 tons per day, according to the weather, and in summer time the amount collected is almost negligible. The ashes are used to fill depressions in sand streets. The collection for disposal of cinders from

manufacturing plants has to be looked after by the property owners, however, since the operation of the destructor plant it has proven advisable to haul a certain amount of cinder to the plant in order to increase the amount of steam and also during the months of July and August when the melon season is at its height to use a certain amount of cinder to increase the amount of combustible matter. Twenty tons of melon rinds per day contain an excessive amount of moisture and with the addition of a certain amount of cinders with other rubbish, this waste is reduced without serious difficulty to inorganic matter. It has been found that the cinders from manufacturing plants collected contain from 15 to 20 per cent. of fuel and each ton furnishes about 2,500 B. T. U.; then again the use of cinders assist in forming more vitrious clinker which increases its value for road foundation or concrete material.

Dead animals are delivered to a rendering plant operated by a private party and the city receives a revenue from same.

Street sweepings are sold, producing a revenue to the city.

Sweepings from catch basins are taken to low ground outside the populated section of the city, and it has been found that no objection has been raised to this method of disposing of same.

The city at this time has about 1,500 vaults and cesspools, the cleaning of which is regularly done by private parties who have a contract with the city, and night soil is taken outside of the city limits and used for fertilizer purposes. With the construction of the extension of the sewerage system, which is now going on, the vaults will be practically eliminated.

The sweepings from city stables are sold.

The refuse taken to the destructor plant consists of household, hotel and restaurant garbage; rubbish from households, hotels, stores and warehouses; paper that is collected from paper boxes and rubbish cans. The city furnishes large wooden boxes to stores, restaurants, hotels and theatres in which paper, excelsior and light material is placed.

Description of Savannah's High Temperature Destructor Plant: Method and Cost of Operation.

Savannah recently completed the construction of a high temperature destructor, which has been in continuous operation for nine months, in fact, from the date that it was completed on March 23, 1914. The period of operation has been long enough to thoroughly test its efficiency. The destructor is of the Heenan-Froude type, and was constructed by the Destructor Company of New York.

The destructor has a daily capacity of destroying 130 tons of mixed refuse, consisting of garbage, rubbish and ashes and stable sweepings.

The disposal of carcasses, street sweepings and stable sweepings is done with revenue, and it is not contemplated that this portion of the city's refuse will be destroyed at the destructor, although the plant is capable of disposing of this waste.

The writer in studying the various methods of disposal of garbage and the various types of destructor plants recommended to the city a plant that would result in generating as much steam as possible from the burned refuse without auxiliary fuel, and with this in view the plant was constructed adjacent to the city water works pumping station on property belonging to the city. The distance between the walls of the destructor plant and the pumping station is only 60 feet, and steam is conveyed direct through pipe from the destructor to the steam header in the boiler room of the water works. The close proximity of the refuse disposal plant might be considered objectionable, if not dangerous, but at no time since the plant has been in operation has the pumping station received any odor what-so-ever, nor have there been any objectionable features whereby the water supply is in the least endangered.

In the destructor plant there are two 65-ton capacity per day Heenan type furnaces. Each unit comprises four cells about 28 inches wide on the bottom, 34 inches at the top, 16 inches deep, 8 feet long.

Each unit has a separate large combustion chamber, a 200 horse-power Wickes water-tube boiler and air heater and centrifugal fan for supplying forced draft. The cells are fitted with trough grates, which is a comparatively recent development, but is already quite extensively used in plants constructed by this company and by Heenan-Froude, Ltd., Manchester, Eng., who made the original design. The contract also covered a building to house the plant, a storage pit of 260 cubic yards capacity for receiving the refuse, a regenerator or preheater, electric hoist for taking the material from the storage pit and transferring it to the containers, necessary instruments for measuring and recording conditions of the furnaces, a steam turbo or engine driven generator of 75 k w. for supplying the necessary current for lighting the plant and operating the motor. The cells are so constructed as to have a burning area over each grate of 20 square feet, each boiler to have a heating surface of 2,000 square feet with a working pressure of 160 pounds per square inch. The stack, of radial brick construction, is 150 feet high and $6\frac{1}{2}$ feet inside diameter at the top. The receiving storage pit as constructed in this plant has advantages over some that have been observed at other plants. It is 32 feet long, 20 feet deep and 11 feet wide. The greatest length is parallel with the beam supporting the crane carrying the hoisting grab bucket, and the bucket can reach any of the material in the pit by direct drop, without extra handling in the pit. Then again, the bucket can pick up any portion of the refuse dumped in the hopper and distribute it over the surface if desired, to bring about a better mixture. The combustion chamber is of ample capacity and properly proportioned to receive and thoroughly mix and burn all gases coming from the different cells discharging into it. There is ample space for the collection of dust in the chambers and a door to same is large enough to permit the entrance of dead animals.

A superheater, of the Foster type, superheats the steam generated by the boiler. The air heater is located immediately at the rear of the boiler. The supply of air for forced draft is taken from the ventilating system in the building. The containers into which the material is deposited from the grab bucket are arranged one over each cell of the furnaces. Each has a capacity of about one cubic yard and they are closed by horizontal sliding doors built into two parts. Each cell receives charges of about one cubic yard. The space above the grate is common to each cell and to the combustion chamber, so that there is free interchange of heat between cells. The main grates on which the combustion takes place are of heavy cast iron construction. They are perforated with a sufficient number of holes to give proper distribution of air throughout the refuse and at the same time to secure the maximum cooling effect on the iron supports. The clinker car is of special design to receive the clinker as it is withdrawn from the furnaces.

Guarantees.

The plant shall be capable of destroying under normal operation, without additional fuel, 130 tons of refuse in 24 hours. No odors or abnoxious gases shall escape from the chimney or the building. That at no time during the normal operation of the plant shall the temperature fall below 1,250 degrees F. and that an average temperature of 1,500 degrees F. shall be maintained in the combustion chambers. That the number of pounds of steam generated in the boiler from and at 212 degrees F. per pound of refuse consumed shall not be less than 1.3 pounds of refuse consumed. That the net effective boiler capacity in horse power for steam utilization over and above that required for operating the plant shall be 330 horse-power, based on 34.5 pounds per boiler horse-power. The cost per ton for the incineration based upon the schedule of wages to be paid and with force as required and set out in the specification shall not exceed 40.4 cents per pound. Another important guarantee is as to the number of pounds of refuse to be burned per hour per square foot of grate area upon which final combustion takes place. In this plant it is guaranteed not to be less than 68 pounds, which is a reasonable guarantee.

Cost of Plant.

As stated above, the plant was constructed on city property, so that there was no cost to the city for a site.

The total cost for the plant, including all extras, steam connection with the pumping station, clinker platform, etc., was $126,271.

Operation.

All refuse brought to the plant is weighed and then dumped into the storage hopper at the ground level. It is taken from the hopper by a grab bucket operated by an electric transporter and delivered to the containers, one of which is located over each cell of the furnaces. At the bottom of the containers is a solid door operated hydraulically, operating of which is

done on the stoking floor, which enables the stokers to fill their grates in accordance with the requirements of their fires.

Stokering is done through a supplementary door, which avoids the necessity of opening the large door through which the clinker is withdrawn.

The clinker formed on the grate is removed by semi-mechanical means. The sides of the grates diverge slightly from the rear to the stoking door. There is a large bar to which is fastened a plate which forms an upturned hoe laid on the bottom of the grate before the first charge is dropped upon it, and the clinker is pulled out bodily by power obtained from a hydraulically-driven winch onto a hand-pushed car, which is pulled over a level paved surface to the dump. This method of clinkering permits of the clinker being removed from the grate in from three to four minutes. The platform at the dump is on the same level as the stoking floor and the clinker is dropped over a vertical wall. While withdrawing the clinker, regulating valves are operated so as to shut off the air supply coming from the air heater.

One great advantage of the furnaces at this plant over the furnaces constructed at some other cities is that a deep fire is maintained, which enables the wet portion of the refuse to be more thoroughly dried and destroyed than in shallow grates. In my opinion, the success of this plant is partly due to this particular feature.

The average time of burning charge is 20 minutes. Usually six charges are made for each clinker produced on the grates. When the plant is working at its full or nearly full capacity the labor required is operated in three shifts of eight hours each. With the destruction of from 60 to 75 tons of garbage only one unit is used with three shifts of labor. This is better than to use two shifts, working both furnaces, for a more even supply of steam is delivered to the pumping station.

During July and August, when the delivery of watermelon rinds delivered to the plant averaged 20 tons daily, this amount of extra wet garbage, bringing the percentage of garbage above the guarantee is only destroyed by adding dry material, which has sufficient heat units in same to offset the excessive moisture in the garbage. This is brought about by adding about 10 per cent. in weight in cinders collected from manufacturing plants. With the addition of these cinders, complete combustion of the garbage is obtained.

From the day the plant commenced to consume the garbage on March 24, 1914, to the present date, all of the refuse delivered to the plant has been consumed and none had to be hauled away. The amount saved in fuel at the water work plant from April 1 to December 1 was approximately $4,500.

If the refuse delivered to the plant equals the capacity of the plant, sufficient steam will be furnished to operate the pumping station entirely and an annual saving of approximately $12,000 would ensue to the city.

The pumping station has two ten-million duplex compound Holly Gaskill

pumping engines and two cross-compound air compressors, all of which are operated condensing. The steam pressure carried at the water works plant is 90 pounds, but at the destructor plant is carried up to 150 pounds, with 100 degrees superheat. The pressure, however, is reduced by passing through a reducing valve on the main steam header in the boiler room at the water works.

The total amount of refuse consumed from March 24, when the plant was completed to November 30, was 18,700 tons, an average of 68 tons daily. The total cost for operating the plant for destroying garbage was $10,900, or a cost per ton of 60.2 cents. Allowing for the saving of fuel at the pumping station, for this period, amounting to 24 cents per ton destroyed, the net cost for destryoing the refuse was 36 cents per ton.

The percentage of clinker obtained from destroying the refuse varies from 20 to 30 per cent. of the total of refuse burnt. During the season when the refuse is dry, the weight of the clinkers is from 20 to 25 per cent. During July and August this varies from 25 to 30 per cent. The clinker is now being used for road building and raising low lots and it is estimated to have a value equal to the cost of removing same from the plant.

The cost of destroying the refuse, the amount of evaporation of water, and steam obtained is based on the refuse having the following percentages of material:

45 per cent. garbage;
40 per cent. rubbish;
10 per cent. ash or cinder;
5 per cent. manure by weight;

the garbage to consist of organic material, vegetable and animal with water and grease; rubbish to consist of paper, rags, excelsior, straw, glass, etc.

Labor Required to Operate.

Labor for each shift with plant working at full capacity requires one man to feed hoppers, four stokers, one engineer, one craneman for each shift of eight hours, making the total labor charges per watch $17.50 or $52.50 per day of twenty-four hours. This, however, is not adhered to, and with the amount of refuse destroyed, viz.; 68 tons daily, except in the vegetable and melon season, the cost of labor is $44 per day of twenty-four hours.

Tests.

The plant was operated for five months before it was accepted by the city and final payment was made to the contractors, in order that its operation could be watched for a reasonable length of time, and also to observe if any weakness would develop requiring changes. There were also three tests made under conditions that would enable the city to ascertain whether the plant could work to its guaranteed capacity and whether it would fulfill all of the requirements of the contract and specifications.

The details of the final test are given on p. 913, and it is observed that the plant exceeded the requirements of the specifications and contract in the test. It has also worked efficiently through-

out the period that it has been in operation. No obnoxious odors emanate from the stack or building. Under normal operation of the plant the temperature in the combustion chamber averages about 1,700 to 1,800 degrees and at times it is necessary to wet the garbage and rubbish before it is taken to the furnaces, in order to keep the temperature below 2,000 or 2,200 degrees. To permit of a higher temperature might endanger the lining of the combustion chamber. The water evaporation exceeds by about .2 of a pound the guaranteed evaporation.

The writer highly recommends the disposal of refuse of southern cities by high temperature incinerators, and he further considers the revenue derived from the burning of garbage, rubbish and ashes mixed sufficient to warrant the design of a plant that will generate steam and to use same for commercial purposes.

While the disposal of waste by incineration has made rather slow advancement, with the elimination of some of the crude and visionary plants that have in the past been constructed in some of the cities, and with a better system for ascertaining the amount and character of refuse of cities it is certain that with the construction of reliable types of furnaces and destructors will advance the adoption of a sanitary method of refuse disposal.

RESULTS OF TEST OF HEENAN DESTRUCTOR AT SAVANNAH, GEORGIA AUGUST 21ST–22D, 1914.

Duration of Test: 3 a.m. 21st–12.30 a.m. 22d, 21½ hours.
Type of refuse: Garbage, 45 per cent.; rubbish, 40 per cent.; manure, 5 per cent.; ash, 10 per cent.
Type of destructor: Two. Four trough grate furnaces with forced draft.
Number furnaces at work: Two.
Total grate surface: 160 square feet.
Type of boilers: Wickes' Vertical Water Tube equipped with Foster Superheaters.

		Builders guarantee.
Total heating surface of each boiler	2,000 sq. ft.	
Total refuse burned: 13,877 tons or	277,550 lbs.	
Total refuse burned: per hour	12,909 lbs.	10,833 lbs.
Total refuse burned per sq. ft. grate surface per hour	80.6 lbs.	68 lbs.
Total clinker and ash: (Approx.)	68,608 lbs.	
Percentage of clinker and ash to refuse burned	24.7%	
Maximum combustion chamber temperature	2,000°F.	
Minimum combustion chamber temperature	1,700°F.	1,250°F.
Average combustion chamber temperature	1,845°F.	1,500°F.
Average steam pressure (gauge)	120 lbs.	
Average temperature of steam	523°F.	
Average superheat	173°F.	100°F.
Average temperature of feed water	206°F.	
Total water fed to boiler	397,162 lbs.	
Total water evaporated from and at 212°F.	450,382 lbs.	
Total water evaporated per pound of refuse	1.62 lbs.	1.3 lb.
Water evaporated per pound of combustible	2.15 lbs.	

		Builders guarantee
Total B.H.P. developed per hour	607 lbs.	
Estimated h.p. used in plant for 75 k.w. non-condensing, turbo generator set and boiler feed pump	118	
Excess B.H.P.	489	330
Average air pressure under grate	3¼ in.	
Average air temperature	252° F.	
Average stack draft	.72 in.	
Average Co. 2	11.43%	
Total number charges, both furnaces	447	
Average weight of charge	621	
Total number clinkers drawn, both furnaces	64	

Cost of Operation Based on Contract

Hoisting; One man per shift of eight hours at	$2.40	$2.40
Stoking, four men per shift of eight hours at	2.40	9.60
Clinker removing, one man of eight hours at	1.50	1.50
Engineer, one engineer of eight hours at	4.00	4.00
Total labor charges per shift		$17.50
Total labor charges per day of 24 hours		$52.50
Total labor charges per ton at 130 ton rate		.404

Cost of Operation Based on Actual Cost

Hoisting, one man per shift of eight hours at	$2.25	$2.25
Stoking, four men per shift of eight hours at	1.75	7.00
Clinker removing, one man of eight hours at	1.50	1.50
Engineer, one engineer of eight hours at	4.00	4.00
Total labor charge per shift		$14.75
Total labor charge per day of 24 hours		$44.25
Total labor charge per ton at 130 ton rate		.340
Total labor charge per ton for 138.75 tons in 21½ hours		.318

Remarks.

Test made with running start. All hoppers were empty, and then charged with test mixture. On completion of test, hoppers were empty. All Combustion Chamber Temperatures taken with Thermo-Electric. Recording Pyrometer. All other temperatures were taken with Mercury Thermometers. Water measured with a Worthington Hot-Water Meter. Steam Pressures taken with a recording pressure gauge connected with main steam line. Steam delivered to main header at Water-works, and used to operate one 10,000.000 gallon pumping engine and one 1850 cu. ft. Cross Compound Condensing Air Compressor. From 12:15 to 5:10 P.M. 10,000,000 gallon pump speeded up. Steam from plant also used to operate all prime mover units used for generation of power for use in plant. At 7:00 A.M. of August 22nd, all refuse in storage pit was burned, and from then until 8:00 A.M. insufficient refuse was delivered to keep the plant going at capacity.

Weather during test was hot and humid, with occasional showers. Test was started at 3:00 A.M. of 21st and completed 12:30 A.M. of 22nd. All calculations based on A.S.M.E. Standards. Safety valves of boilers were popping off from 5:30 P.M. until 6:30 P.M.

City.	Method of disposing of city's refuse.				Crematory or incinerator. Type and capacity.	Contemplating any change.
	Garbage.	Rubbish.	Street sweepings.	Ashes.		
Ashville, N. C., 34,000.....	Delivered out of town in covered receptacles	Burned at incinerator	Hauled to concrete pit and sold to farmers	Fill gulleys and make fills, etc.	Incinerator, Dixon type. 30 tons day of 24 hours	No
Athens, Ga., 20,000.....	Burned in open fires	Burned in open fires	Placed on city farm	Carried to remote places where not objectionable	None	
Augusta, Ga., 50,000.....	Hauled to dump outside of city limits	Hauled to dump outside of city limits	Hauled to city convict farm	Hauled to dump	None	Yes. Will put in incinerator
Beaumont, Tex., 31,000.....	Burned daily	Burned daily	Burned daily	Burned daily and used for filling in low places in city	Incinerator in process of construction, Nye Odorless	Not at present
Bessemer, Ala., 18,000.....	Dump	Dump	Used on city park	Used in repairing alleys	None	Not at present
Birmingham, Ala., 175,000...	Incinerator	Incinerator	Hauled to dump	Making walks on muddy streets	4 incinerators. Constructed by city. 40 tons per day each	Not at present
Charlotte, N. C.....	Crematory	Crematory	Sold to parties	Hauled to ground near crematory	Old style crematory. 20 tons per day	Yes. Incinerator

REFUSE DISPOSAL IN SOUTHERN CITIES.

City.	Method of disposing of city's refuse.				Crematory or incinerator. Type and capacity.	Contemplating any change.
	Garbage.	Rubbish.	Street sweepings.	Ashes.		
Chattannooga, Tenn.	Dump	Dump	Dump	Dump	Dump	Contemplate installing incinerator in near future
Covington, Ky., 65,000	Burn same	Dump	Dump	Dump	Gas furnace	Not at present
Durham, N. C., 20,000	Carts	Carts	Carts	Carts	Nye Odorless in process of construction	Not at present
Montgomery, Ala., 50,000	Incinerator	Incinerator	Used as fertilizer by farmers	Incinerator	Heenan Froude	No
Paducah, Ky., 25,000	Burning	Dumping	Dumping	Dumping	None	Yes
Raleigh, N. C., 25,000	Crematory	Crematory and clay streets	Crematory	On clay streets, and rolled	Nye Odorless	No
St. Augustine, Fla., 5,000	Dump	Dump	Dump	Dump	None	
Selma, Alabama, 15,000	Dumped			Dumped	None	Yes when money becomes obtainable
Sumter, S. C., 10,500		Burned near city limits	Used on city farm	Generally disposed of on premises	None	
Tampa, Fla., 60,000	Incineration	Incineration and dumping	Burned	Used for covering dump	Dixon. 100 tons 24 hours, in 4 units	Not at present
Winston, N. C., 35,000	Hauling it away				None	Yes
Waycross, Ga., 18,000	Incinerator	Incinerator	Used on city farm	Used on city farm	Nye Odorless. 15 tons	No

City.	Method of disposing of city's refuse.				Crematory or incinerator. Type and capacity.	Contemplating any change.
	Garbage.	Rubbish.	Street sweepings.	Ashes.		
F. Worth, Tex., 94,000.....	Hauled away by contract	Hauled away by contract	Hauled away by contract	None	None	Yes, in near future
Pensacola, Fla., 25,000.....	Incinerated	Incinerated, filling, etc.	Parks and squares	Filling low places, etc.	Yes. Nye Odorless Crematory. 8 to 10 tons each 12 hours	No
St. Louis, Mo., 800,000	Reduced for by products gasoline system	Hauled to public dumps such as quarries, etc.	Dumped in the river	Hauled to low property outside city and dumped in old quarries	None	Present contract to run four years
Shreveport, La., 40,000	Crematory	Sold and crematory			Crematory	
Savannah, Ga., 80,000.....	Incinerator	Incinerator	Sold	Used for filling streets	High temperature incinerator	No
Charleston, S. C., 59,000....	Dump	Dump	Dump	Dump	None	Studying system of incineration
Mobile, Ala., 58,000.....	Dump	Dump	Dump	Dump	None	No
Jacksonville, Fla., 58,000....	Fed to hogs	Sold and dumped	Dump	Dump	Crematory not in use	Yes
Atlanta, Ga., 155,000.....	Incinerator	Incinerator	Incinerator	Incinerator	High temperature incinerator	No
Columbus, Ga., 20,000.....	Dump	Dump	Fertilizer	Dump	None	Installation of incinerator next year

REPORT OF THE COMMITTEE ON WATER SUPPLIES OF THE SANITARY ENGINEERING SECTION

FRANCIS F. LONGLEY, *Chairman.*

Read before the Sanitary Engineering Section of the American Public Health Association, Jacksonville, Fla., December 4, 1914.

THE Council of the sanitary engineering section in nominating this committee some two years ago stated that the functions of the committee would be to select suitable fields for committee work, and be prepared to suggest the most important topics which they believed to be suitable for committee action. No special committees have been appointed by the Council to deal specifically with any of the topics suggested. On the other hand, the instructions to the committee this year were to take up and consider any special phase of the broad topic of water supplies, and to present reports preliminary or final in character on special or particular aspects of the field of activity which they have been appointed to consider.

The report of last year's committee is contained in the December, 1913, number of the AMERICAN JOURNAL OF PUBLIC HEALTH. Several of the features of water supply development mentioned in that report were merely chronicles of the present status of those phases of water supply, and little perhaps can be added to them at the present time. Others, such as those two features relating to decolorization of water, are relatively new developments, and the thing which is most to be desired in connection with them is the application of these principles in actual practice and the recording of the results of such application.

It appears to this committee that the subject that will be most fruitful for our study and report and which will be of most value at the present time, is the disinfection of water, which was touched upon briefly in last year's report. The committee has no reports to present upon any other subjects.

Disinfection has come to be looked upon universally as an important part of water purification processes. Its development has been recent and rapid. A great amount of evidence demonstrating its efficiency and economy has been obtained and much has been written on this line from time to time.

The following matter of this report is the result of an effort to bring together as much as possible of this information and to study it with a view to giving the results in the most useful form to this association.

So many new developments in disinfection processes are being made from time to time, that a report of this kind cannot be considered in any sense final, but merely a report of progress to the date of writing.

Inquiries for Disinfection Data.—For this study the committee has circulated a large number of inquiries. A list of questions was prepared intended to cover the field of disinfection

as fully as was consistent with the purposes of the committee. A list of the water supplies in the United States and Canada in which some disinfection method was known or believed to be used, was prepared from all available sources. The hearty coöperation of engineers, health officers and others who were appealed to in this matter, was secured, but there can, of course, be no assurance that the list was complete. The committee appreciated the fact that lists of questions of this kind are not popular, but they had all been live questions with many waterworks superintendents and engineers, and therefore, the circulation of a questionaire seemed to be the most fruitful way of securing the information wanted. These inquiries were sent out then to all the cities named in said list, the total number being about 240. Of these the committee received replies from about 110, or nearly one half of the total number of inquiries. These replies represent in the aggregate, water supplies of somewhat more than 2,000 million gallons per day.

Kinds of Water Treated.—About 75 per cent. of the supplies for which replies were received, are river waters. About 20 per cent are from lakes, and the small remainder are ground waters.

Methods Used.—Of all the replies received by the committee, about 80 per cent. are stated to use or to have used hypochlorite of lime, and the balance, liquid chlorine.

Upon the use of ozone and ultra-violet rays as disinfecting agents for water supplies, but little more can be said at the present time than was stated in the report of this committee last year. In brief, the results of laboratory experiments with these agents are promising, but there are practical difficulties that are hard to surmount to make them compare favorably with the methods in common use. The replies to the inquiries of the committee do not indicate any tendency towards their more general application.

The use of liquid chlorine began so recently that but little of the data received relates thereto. The matter that follows, therefore, relates generally to hypochlorite, unless something else is clearly indicated.

Increase in Use of this Treatment.—The first application of hypochlorite noted among the replies was in 1908, in which year disinfection by this means was begun at the Bubbly Creek plant in the Union Stock Yards in Chicago, at the Boonton Reservoir of the Jersey City supply, and upon the municipal water supply of Poughkeepsie, New York. The several years following showed a rapid increase in the number of installations, although the records for 1913 indicate a falling off. The returns for the year 1914, of course, are incomplete. Of the total installations regarding which replies were received, the percentages installed each year have been as follows:

	Gallons per day.
13% in 1909, representing a total of	100 million
14% in 1910, representing a total of	450 million
22% in 1911, representing a total of	320 million
22% in 1912, representing a total of	710 million
18% in 1913, representing a total of	70 million
8% in 1914, representing a total of	265 million

Use and Point of Application.

A question was proposed with the idea of finding what the practice was as to the point of application of the treatment. Some 37 per cent. of the cities replying use a disinfection without other treatment, and the balance use it as an adjunct to some treatment, filtration in most cases. In 57 per cent. of those cases in which it is used as an adjunct to filtration, it is used as a final treatment; in 26 per cent. it is used after coagulation or sedimentation and before filtration; in the remaining 17 per cent. it is applied before coagulation and filtration.

The data at hand do not give any reasons for the application before coagulation. In general, an effective disinfection may be secured with a smaller quantity of hypochlorite, if it is applied after rather than before filtration. It should be noted that the storage of chlorinated water in coagulating basins, and its passage through filters, tend to lessen tastes or odors contributed by the treatment, and this fact may in some cases account for its use in this way.

Beyond this, there is nothing in the moderate amount of bacterial data secured in connection with this work that enables the committee to generalize upon the relative advantages of these different points of application.

Supervision.

About 45 per cent. of the replies indicated supervision of the treatment by a chemist or other technically qualified person.

Application.

The application of the disinfection treatment is in most cases continuous; only about 10 per cent. of the replies indicating intermittent application.

Cost of Hypochlorite.

As might be expected, the cost of hypochlorite varies widely in different cities. The data indicate that two factors are mainly responsible for the variations in the cost: First, the distance it has to be transported, and second, the quantity purchased in a year.

In the eastern part of the United States as far west as to include part of Ohio, the average cost is $1.45 per hundred pounds. From that point west to the Mississippi River or thereabouts, the average cost is $1.78. From there west to include about Kansas and Colorado, the average cost is $2.60. West of that the average cost is about $3.00. There are a number of points in the south where unusually high prices are paid for hypochlorite of lime.

Taking all the data as they stand, plants having a capacity in excess of twenty-five million gallons per day pay an average of $1.46. Those having capacities from ten to twenty-five million pay an average of $1.64. Those with capacities six to ten million pay $1.78. Those with capacities three to six million pay $2.33. Those with capacities one to two million pay $2.53, and those with capacities less than one million pay $2.84 per 100 pounds. The variations

within each one of these classes are of course large.

An interesting point presented itself in the increased prices a number of cities report having to pay for hypochlorite since the beginning of the European war. Eight cities report such an increase, which has ranged from a minimum of 45 per cent. to a maximum of 240 per cent. and has averaged 92 per cent. The evidence in some cases indicates that the price of hypochlorite had made a large advance before the war broke out, and the war, therefore, may not be the cause of the increase.

Total Cost of Apparatus.

An analysis has been made of the total cost of equipment for disinfection by means of hypochlorite. The cost per million gallons varies widely, and does not seem to bear any very close relation to the capacity of the equipment. It is true that the greatest cost per million gallons capacity, namely, $2,400, was for a plant of only 0.5 million gallons per day, nearly the smallest capacity; and the smallest costs per million gallons capacity, namely, $4 and $6, were for plants of fifty million and fifteen million gallons capacity, respectively. The wide variations in cost are not consistent with these, however. For instance, there is a cost of $12 per million gallons for a capacity of less than one million gallons per day, and a cost of $416 for a capacity of twenty-four million gallons per day.

These variations are accounted for by the fact that the designs vary widely; some are the merest makeshifts, while others are elaborate; some of the costs quoted include no building costs, while others include expensive structures. Taking the figures as they stand, not including the liquid chlorine plants, the total costs per million gallons are stated not to exceed $25 in 12 per cent. of the supplies, $50 in 30 per cent.; $100 in 42 per cent.; $250 in 67 per cent., and $500 in 87 per cent. of the supplies under discussion.

Total Cost Per Million Gallons.

The total cost per million gallons for the process also varies widely. By far the greater number of costs stated lie between 10 and 50 cents per million gallons, the average for these being about 25 cents.

The data are not full enough nor accurate enough for a comparison of the costs of disinfection by means of hypochlorite and of liquid chlorine.

The Quantity of Hypochlorite Required.

The maximum quantity of hypochlorite stated is 60 pounds per million gallons, this is at the Bubbly Creek plant in Chicago, and the nature of the water treated is well known to require a large dose. There is one other case recorded of a maximum requirement of 60 pounds per million gallons. For a water of extremely high color this is perhaps to be expected. The lowest maximum quantity stated is 4 pounds per million gallons. The average of all the maximums stated is 17 pounds per million gallons.

Bubbly Creek again shows the high-

est average dose of 55 pounds, the next highest is 35 pounds, and the lowest average dose stated is 3 pounds. The average of all the averages stated is about 11 pounds per million gallons.

Judging from the information—or lack of information—received in response to those inquiries bearing upon the relation between quantity of hypochlorite required, and color or turbidity in the water, it seems to your committee that a surprisingly small amount of attention is given in the various cities to following out this relationship. A knowledge of this relation is important, as it influences the quantity of hypochlorite that is required for a given water, the quantity that may be applied without producing objectionable tastes, and the economy of the treatment. The reason for the lack of attention may perhaps lie in the fact that the cost of the hypochlorite required for any water is trifling; and it is not of great importance just what quantity is applied, so long as it is enough, on the one hand, to give good bacteriological results, and on the other hand, not so much as to produce objectionable tastes or odors.

Storage after Treatment.

The matter of storage of the treated water before going into the city mains is of interest. It is generally considered desirable to have some storage, in order that the disinfecting agent may have adequate time to reach its full effect before the water goes to the consumer, and to permit the dissipation of tastes or odors contributed by the treatment.

Forty per cent. of the supplies about which we have information have no storage after treatment; 18 per cent. of them have less than one hour; 9 per cent. of them have from 1 to 3 hours; 5 per cent. from 3 to 12 hours; 11 per cent. from 12 to 24 hours and 17 per cent. have more than 24 hours.

Tastes and Odors.

An effort was made to ascertain the conditions under which any objectionable tastes or odors were noticed. An analysis of the data sent in answer to this question, shows that in one place a maximum dose as great as 37 pounds per million gallons has not given rise to objectionable tastes or odors, and in numerous places 20 to 30 pounds have not been noticeable. The average amount stated for which no odor or taste was noticed was about 14 pounds per million gallons. The supplies in which it was definitely stated that no tastes or odors were noticeable included about 40 per cent. of the total. Among the others there were general comments as to the occurrence of objectionable tastes or odors in various forms, but in the main indicating that they are likely to occur with changes in the character of the water treated, especially at times of storm or freshet.

So far as is indicated by the somewhat incomplete data in hand, the largest quantities of hypochlorite are used in those supplies in which the color or turbidity of the water are highest. The absorbing effect of turbidity or coloring matter upon hypochlorite has long been recognized. It finds confirmation in the data at hand,

although unfortunately these are not complete enough to enable the committee to establish any definite relationship between color, turbidity and quantity of disinfecting agent that may be used without objection.

Materials Used.

The replies indicate that the commonest construction of tanks for hypochlorite is concrete. Some 47 per cent. of the supplies under consideration have concrete tanks, and about 20 per cent. in addition thereto have wood or iron tanks lined with concrete or cement mortar. Something more than 20 per cent. are of wood without lining. The balance are either wood with lead lining, wood or iron with some protective or acid resisting paint or porcelain lining. The liquid chlorine is universally contained in special iron cylinders.

The piping seems in the general case to have been put together of the materials most easily available without regard to corrosion. Fifty-six per cent. of the replies indicate the use of iron pipe either black or galvanized. Fifteen per cent. use lead pipe and about an equal number use brass. A few use lead-lined iron pipe, cast iron pipe, hard rubber, rubber hose, bronze or copper pipe.

The same comments apply to the kind of valves and fittings commonly used. Sixty-six per cent of those are of brass, such as are usually found in stock. Some fourteen per cent. state that bronze valves and fixtures are used. It is possible that some of these upon further inquiry might prove to be brass. A few use iron valves or fittings and a few have fixtures made of vulcanite, rubber composition, copper, lead, glass, etc.

The materials which seem to have shown the greatest resistance to the corrosive effects of the disinfecting agent are concrete tanks, lead pipe and rubber composition. Several of the answers indicate that copper, cast iron, and lead-lined iron pipes are used without corrosion and a number indicate too that brass and galvanized iron are used without corrosion. The evidence as to these two last materials is, however, contradictory, as other answers indicate considerable corsion with galvanized iron and brass. It seems likely that the quality of the material and some peculiar local conditions may perhaps be determining factors in the corrosive effect upon these two materials. The data show the unmistakable corrosive effect upon wrought iron and also upon wood.

Tests for Presence of Free Chlorine.

Only about 30 per cent. of the plants under consideration make any tests whatever for the presence of free chlorine. About three-quarters of those use one or another of the methods involving iodine and starch, and the balance use orthotolidine.

Strength of Hypochlorite.

Evidence has been found in the past of occasional large variations in the strength of commercial hypochlorite. In answer to an inquiry on this point only 29 per cent. indicated that the strength of hypochlorite as purchased had been determined. That this is a

point of considerable importance is indicated by the following figures. The maximum percentage of available chlorine stated was 42 per cent. Numerous others ran as high as 39 or 40 per cent. The minimum stated was 15 per cent., with several others less than 20 per cent. The average strength was 33 per cent. In two cases the maximum percentage strength noted is as large as two and one-half times the minimum strength. These variations in quality in the commercial hypochlorite are significant, and it is obvious that the strength should be determined and a correction made in the application, if necessary, if the best results are to be secured.

Deterioration in Strength of Solution on Standing.

An inquiry was included to get a line on the matter of deterioration of solutions of hypochlorite on standing. Negative answers were received in many cases, and in others no answers whatever to this question. There is no way of knowing whether the negative answers represent actual tests for the determination of this point or simply absence of knowledge in regard to the matter.

About 25 per cent. of the answers included statements which indicated that there is actual deterioration in the strength of solution. The statements are not specific, nor entirely consistent. The general experience, however, seems to show that there is substantially no deterioration in a reasonably short period. There are no statements that afford definite evidence of deterioration within a twenty-four hour period.

Bacterial Action.

The efficiency of disinfection treatments in general is well shown by the data secured on bacteria counts after chlorination. Records of this are given in some 60 per cent. of the replies. Something more than 50 per cent. of these show an average bacterial count after treatment not exceeding 20 and some 75 per cent. or more show averages not exceeding 50. The corresponding raw waters have average bacteria counts ranging from less than 100 to more than 7,000 and averaging about, 1,200.

It is interesting to note that more than 85 per cent. of the counts given as the minimum after chlorination are less than 10.

While the data given cannot safely be used for too detailed a generalization, it may be stated that they indicate that a bacterial removal of 98 per cent. may reasonably be expected. In many cases the efficiency is greatly in excess of that.

Changes in Bacterial Content Sometime after Treatment.

Certain of the inquiries were aimed to bring out information bearing upon the moot question as to the fate of bacteria after disinfection treatment especially by hypochlorite of lime. It has frequently been pointed out that, while the bacterial counts shortly after the treatment show a high efficiency of removal, some time afterward they may increase to large numbers, reach-

ing or even exceeding the raw water counts.

At least two different views have been advanced upon this point. According to one, certain kinds of bacteria, especially the spore-formers, may resist the action of the disinfectant, and later develop rapidly. According to another, there may be a toxic effect which results in a retarded development of the bacteria of many varieties on the plates within the usual period of incubation, with a subsequent development after the toxic effect wears off. The views are not widely different, excepting as to the varieties of bacteria thus affected. It is reasonable to suppose that spore-formers would have high resistance, but there may be other types too, that resist, especially with moderate doses.

In the answers to the question upon this point, about one-half those who answered stated that no difference in bacterial count was found immediately after the treatment and at remote points. Many others did not reply to the question. These may either mean that the difference was looked for and not found, or that it was not looked for at all. The other half stated that the count increased after treatment. This is stated in various ways, but the answers seem to indicate clearly the main fact as stated. In only three cases was it stated that the counts were less at remote points than they were immediately following the treatment. None of the replies gave any evidence as to the varieties of bacteria, which would give light upon the different views stated above.

It is not clear without further study just what sanitary significance this point has. The thing that is most needed in respect to this whole question is further investigation on the part of laboratories that have the particular facilities therefor.

With the data in hand as a basis, it will be possible to follow up a number of lines herein suggested, upon which further information is desired. This may properly occupy some of the efforts of the committee for the coming year.

Francis F. Longley,
Chairman.
J. L. Ludlow.
Morris Knowles.
Geo. G. Earl.
Charles Gilman Hyde.

Owing to the widely separated location of its members and the exigencies of business, the committee did not have this report ready in its present form at the time of the Convention in Jacksonville. Correspondence among the members of the committee before and since that time indicates the advisability of a further brief statement.

It is the sense of the committee that the evidence thus far secured does not disprove the need of competent technical supervision in the application of disinfection. On the other hand, in view of the uncertainties still attached to the process, such supervision is of the highest importance, in order to avoid tastes and odors due to overdosing on the one hand, and, on the other, the dangers lying in the combination of possible underdosing and fancied security in the efficiency of the treatment.

It is further the sense of the committee that the following questions are pertinent and important and merit the attention of the committee in its further work:

Intermittent vs. Continuous Treatment.

Is it advisable to apply disinfection continuously in conjunction with filter plants, thus affording the filter operator a means of operating his filter with less regard for high efficiency and more dependence upon disinfection for assuring the good bacterial conditions finally desired? Or, on the other hand, is it advisable to recognize that inefficient operation is more likely to occur at times of exceptional demand than at other times, and that under normal operating conditions, disinfection is an additional safeguard of such value that it should not be given up merely for the chance of securing more careful operation?

Economy in Coagulant.

Are there any merits in the claims sometimes made of economy in the use of coagulants with disinfecting processes used in conjunction with filtration?

Form of Application.

What is the relative desirability of applying hypochlorite as a clear solution, a milky suspension, or a powdered solid?

Application Under Pressure.

What means have been most successfully used for applying disinfectant solutions to pipes under pressure?

There are also other questions of some importance, upon which the committee has sought information, with but little success thus far.

Francis F. Longley,
Chairman

PROGRESS REPORT OF THE COMMITTEE ON SEWERAGE AND SEWAGE DISPOSAL.

SANITARY ENGINEERING SECTION, AMERICAN PUBLIC HEALTH ASSOCIATION.

Read before the Section on Sanitary Engineering, American Public Health Association, Jacksonville, Fla., November 30–December 4, 1914.

Introduction.

THE Committee on Sewerage and Sewage Disposal, after debating the advisability of investigation and report on some of the more technical phases of sewage disposal, such as minimum allowance of dissolved oxygen in water-courses, concluded that for this year at least greater benefit to the Association as a whole would result from enlargement upon some of the essentials contained in last year's report by a discussion of "The Fundamental Considerations in the Design and Maintenance of Sewage Treatment Works which should be Understood by Officials and the Public in Towns about to Install such Works and the Adoption of Methods for the Avoidance of Objectionable Odors."

Design.

Very few towns voluntarily take up for consideration the installation of sewage treatment works, for it seldom occurs that the discharge of municipal sewage into a water-course menaces the health of the people living in that community to an extent that they, on their own initiative, assume the considerable outlay of money needed for sewage treatment. Works of this kind are not revenue-producing, but must be recognized as undertakings involving, for success, constant care and supervision and necessarily liberal expenditure. Usually such outlay of funds is made to obviate damages caused by the pollution of the water-courses or on order issued either by the courts or some constituted state authority. Hence, it is important that officials and the public in towns about to install sewage treatment works should know how to proceed in order to secure the proper kind of works.

No one method or no particular combination of processes is best for adoption in every case. The best treatment is that which, including first cost and cost of maintenance, will most economically produce an effluent suitable for discharge into the local water-courses.

The use to which the stream is put and the available water for dilution should be factors in the design of every plant, and treatment should not be carried further than is made necessary by the conditions of the stream which is to receive the sewage after treatment.

Where streams are used as sources of water supply for near-by towns a higher standard of effluent is required than where the purpose of the treatment works is only to prevent nuisance.

The composition and condition of the crude sewage partly determines the kind of treatment necessary to obtain the required effluent.

Local conditions, such as the kind of sewer system already in use or contemplated, topography of the town, the availability of different construction materials, number and character of population, the presence or absence of industries whose wastes may have to be considered, the probable future development of the town, and finally the financial ability of the community, are all controlling factors in the design of the works.

A good design is important and much first cost can be saved by an experienced engineer in adapting the design to the local conditions, but intelligent supervision after the plant is put in operation is still more important.

A plant designed for partial treatment properly operated is better than a more highly developed plant which is neglected, or operated without regard to the essential theory on which the design was based.

The time has passed when the desirability of any treatment should be predicated on the fact that little or no attendance is required. Rather, all disposal works should be recognized as machines which require intelligent supervision and which, if properly designed and maintained, can be made to produce just that quality of effluent which the diluting capacity of the local stream will render satisfactory. In this way greater general progress in the betterment of stream conditions will result.

It will frequently happen that, in small streams, the dry weather flow can, with profit, be increased by the intelligent use of stored upstream water and the discharge of a partly treated sewage thus made possible at all seasons.

In designing a plant for any community it should be made of adequate capacity, not only for the present but to meet the needs for some years to come, in order to prevent surprise at the increased load and the consequent overload in a few years. Where the growth of a town is very rapid, it may be possible that the increase of population and the infiltration of ground-water may tax the sewerage system and sewage disposal plant to its full capacity by the time the works are completed, thus resulting in a plant which does not meet popular expectation.

On the other hand, where the two-story type of tank is adopted, care must be exercised that the tanks are not made too large, as under such circumstances they are liable to fail of their purpose by reason of the sewage in the settling chamber becoming septicized and creating nuisance.

To overcome these conditions a comprehensive plan for the works should be adopted which will provide for a sufficient number of units

to be added as the necessity develops and as the art of sewage disposal advances.

Town authorities should not deal with the proprietors of any patented processes or devices for sewage treatment without the assistance of some competent advising engineer. The treatment of sewage has always seemed to be a particularly fertile ground for the exploitation of patented methods; from the early days of the many processes of chemical precipitation, to the present-day electrolytic treatment, and many of these, while apparently successful in the experimental plants, are entirely infeasible on a practical scale. There is danger in deducing results from small test apparatus without scientific study by a qualified expert. Often the cost of such treatment, when undertaken practically, is prohibitive. The proprietor of a process who is looking for a contract will give a bond and make various propositions which appeal to the people of a town and is likely to lead them to favor the acceptance of such propositions. Many costly mistakes have been foisted on communities in this way.

The problem of sewage disposal is not one to which a readymade solution is applicable, but each case should be studied, so that its peculiar needs may be met in the most efficient manner and with the most economical expenditure of funds.

In many of the thickly populated states, the location of the treatment works, the type of works, and the details thereof must be approved by some state commission or department of health. Where possible it is desirable that there shall be preliminary visits to the proposed sites by the agents of the state and town. This will obviate the preparation of plans for two or more sites. Usually such preliminary conferences will also result in an agreement as to the general type of plant required. Where there is no state supervision the town authorities must depend upon the advice of the expert they employ.

One of the most important matters to be considered and one which greatly concerns a community is the location of the treatment works. As a general proposition it is advisable to select a site remote from habitation and public highways, for while it is possible, with properly designed and constructed sewers and treatment works, to maintain by careful operation inoffensive conditions, it must be recognized that by the very character of its work a sewage treatment works can never hope to compete, in point of odor, with a peach orchard in bloom.

Processes.

The available processes for sewage treatment may, for convenience, be divided into three groups:

(a) Clarification or the removal of suspended matter by means of fine screens or sedimentation tanks.

(b) Oxidation or the conversion of the decomposable matters into more stable forms by means of biological forces in intermittent sand filters, contact beds or percolating filters.

(c) Disinfection or the destruction of bacteria usually by means of hypochlorite of calcium.

The many different devices under each heading may allow of a large number of combinations and the selection made should be based on the economical phase of the problem.

Certain processes are very efficient when under the watchful care of scientifically trained operators provided with a laboratory, which would be unwise to adopt for a community whose finances will not allow of such annual expense. In such cases higher first cost of installation may prove to be more economical in the end.

Usually the first process of treatment is the removal of the solid matters which have been maintained in suspension by the velocity of flow in the sewer. In the past, when the solids were allowed to settle in tanks in which the sewage flowed over and in contact with the putrescent deposits in the bottom, odors resulted. Also, when the deposit from such tanks, called sludge, was placed upon the ground or upon drying beds the foul emanations added to the nuisance, but within recent years two-story tanks have been devised and are in successful operation whereby the sewage is settled for a short period of time in the upper story and the sludge allowed to remain in the lower compartment of the tank sufficiently long for the decomposable matters to digest, and the settling sewage is kept from coming in direct contact with the digesting sludge. Such tanks will discharge an effluent practically free of settleable matter in nearly as fresh a condition as when received. The gases evolved during digestion of the sludge away from contact with the sewage are principally methane or marsh gas and carbon-dioxide, both of which are inodorous. Sludge withdrawn from such tanks after digestion is inoffensive, dries quickly and may be used for filling low land or for agricultural purposes with no danger of nuisance.

If the conditions require more refined treatment than sedimentation it becomes necessary to adopt processes for oxidation. This may be accomplished by means of intermittent sand filters, contact beds or sprinkling filters, the choice of which is largely dependent on the availability of different construction materials and the size of plant to be installed. Intermittent sand filters are only economical where large areas of sandy soil are available. The cost of procuring sand and fine gravel and transporting it for a distance makes this type of filter prohibitive in other sections, except for small installations. The sprinkling filter, on the score of economy, and on account of the maximum efficiency secured on a minimum area of land, is generally given preference; yet under certain conditions contact beds are justified.

The present-day tendency is to adopt processes which will maintain as

far as possible aërobic conditions in the liquid at all stages through the plant; the maintenance of such aërobic conditions is the primary consideration in avoiding nuisance.

As the purpose of disinfection is the destruction of pathogenic bacteria, in order to provide a double safeguard against water-borne diseases it can be generally said that disinfection of sewage is an unnecessary refinement, unless the effluent of the sewage treatment works is discharged into a water course adjacent to and above the intake of a water purification plant, and even in such a case the responsibility of protecting the public health should rest upon the purification of the water.

It is not practical to disinfect crude sewage containing particles of organic matter of appreciable size as with the usual period of contact it is impossible for the disinfectant to penetrate the solids.

Odors.

The amount of odors depends largely on the freshness of the sewage and the method of treating and handling the sludge. The freshness of the sewage depends largely on time of travel and the design of the collecting system, on the adaptation of size to discharge, the provision for self-cleansing velocities and on the ventilation of the sewers so as to provide as much natural aëration to the liquid as possible. If the sewage is fresh or if, in other words, it contains dissolved oxygen there will not be serious odors from the application or treatment of the liquid portion, provided the plant is maintained with no lodgment of sewage in pools or overloading of the surface of the filters.

In the sludge there is a potential cause of odors, but by the use of the more modern type of tanks, with thorough digestion of the decomposing solids and discharge on properly prepared sludge drying beds, under favorable weather conditions, no odor of serious moment, noticeable more than a few hundred feet, should ever occur. Odors can be largely eliminated by good design, but their occurrence depends more particularly on proper supervision of the plant.

By the use of the two-story sedimentation tanks, which provide for the digestion of sludge, and by care in the management of the works, plants are operated in Europe and in this country where no odors are noticeable either from the sewage or from the sludge during drying.

In plants where other methods of treatment are adopted, it is probable that odor will be produced. It has been estimated that at such a plant capable of treating the sewage of 50,000 people, with good management, no odors should ever be apparent beyond 1,000 to 1,200 feet from the works, even when sludge is being discharged upon the drying beds or in the spring when the filters are in bad condition due to the past winter interfering with work being done on them.

With smaller plants this distance should be less and with larger plants possibly more. By diffusion, of course, the odor becomes more faint as the above-named distances are reached, and beyond these distances no odor should be noticeable. What might be termed odors strong enough to be disturbingly disagreeable to a person whose nasal sensitiveness is not affected by his knowledge of the source of the odor should perhaps never be found at a distance more than one third of those mentioned. It should, however, be noted that an odor from a sewage plant which if from a farm would never be noticed or which would be accepted as simply natural and reasonable will generally develop complaints of nuisance. Sentiment regardless of facts frequently blames on an inoffensive sewage disposal plant bad odors from other sources. In short, sewage treatment works should be as isolated as it is economically possible.

For the avoidance of odors, the fundamental considerations are the delivery of the sewage as fresh as possible at the plant, the application of the liquid portion to the filters before the sewage has become stale, and the proper treatment of the sludge so as to render it comparatively odorless and easily handled.

Disposal plants should be made attractive by planting and parking, and no money can be better spent than this. The trees to some degree prevent the spreading of the odors, and in the planting of trees and shrubs the direction of the prevailing wind should be taken into account.

Local authorities when they first take up for consideration sewage treatment frequently look upon the plant as a dump for municipal waste and it never occurs to them that it is good policy to spend money to make the works so attractive that people will voluntarily make it the objective point of their Sunday afternoon strolls.

Such beautification and the proper maintenance of the appearance of the plant is the surest and best means of preventing complaints of odors or nuisance, this because of the psychological effect on those living near the plant and also on the attendants who unconsciously adopt a higher standard of cleanliness and care of the works.

To sum up the whole subject of odors at sewage works: Their prevention depends upon the maintenance of aërobic conditions; by cleanliness in the sewers and about the works and by the separation and thorough digestion of the sludge resulting from tank treatment.

And these conditions can only be obtained by skilled operation of both the sewer system and the treatment works.

Frank A. Barbour,
George A. Johnson,
Langdon Pearse,
F. Herbert Snow,
George S. Webster, *Chairman.*

REPORT OF THE COMMITTEE ON REFUSE COLLECTION AND DISPOSAL.

SANITARY ENGINEERING SECTION. AMERICAN PUBLIC HEALTH ASSOCIATION.

Read before the Section on Sanitary Engineering, American Public Health Association, Jacksonville' Fla., November 30-December 4, 1914.

DURING the past year the attention of this committee has been directed again toward a Standard Form for Statistics of Municipal Refuse. At the 1913 convention, the Committee presented a tabulation of statistics from cities made up on a trial standard form for such statistics. These data formed a useful contribution to the subject. This preliminary form, however, was in the opinion of the Committee too comprehensive for general use. The Committee has, therefore, been formulating a simplified "Form." The final arrangement of the form has not yet been completed, although a suggested arrangement has been prepared by Col. Wm. F. Morse.

For the coming year the Committee intends to continue work along this line and to give an extended trial to the shorter, simpler forms. It is a pleasure to record that a committee of the American Society for Municipal Improvements are also working toward the development of a standard form, and it is our hope to coöperate in this activity.

The committee wishes to call the attention of members of the association to comprehensive investigations for improved refuse disposal which have been made at Chicago, Ill., Dayton, Ohio, Toronto, Canada, Detroit, Mich., St. Paul, Minn., Albany, N. Y. and New Orleans, La. The results of the investigations can be secured from the local authorities. Of particular interest is the trial, on a large scale in New York City, of the tractor-trailer method of refuse collection.

New plants for refuse incineration have been put into operation at Savannah, and Atlanta, Ga., and for the reduction of garbage at Schenectady, N. Y. and Los Angeles, Calif. A large number of smaller towns have undertaken the construction of garbage plants without careful preliminary investigation, or the publication of adequate specifications. This practice is not recommended by the Committee, because it too often results in poorly built plants, and in plants, the operation of which, if satisfactory, is generally more expensive than that of better and somewhat more expensive plants; similar to the difference in the cost of pumping water whether simple or triple expansion engines are used.

The chairman of the Committee has received many inquiries for general information on refuse collection and disposal, particularly from woman's

civic organizations. A tabulation of data compiled from the Standard Form for Statistics would be of real service to such civic organizations.

It is the opinion of the Committee that problems of refuse collection and disposal should be worked out more than formerly along engineering lines, and that this feature has not been sufficiently appreciated by public officials. Members of the American Public Health Association should use their influence to counteract this tendency.

Samuel A. Greeley, *Chairman.*
Rudolph Hering,
Wm. F. Morse,
X. H. Goodnough,
John H. Gregory.
Committee on Refuse Collection and Disposal.

PROGRESS REPORT OF COMMITTEE ON SEWAGE WORKS OPERATION AND ANALYTICAL METHODS.

TO THE

SANITARY ENGINEERING SECTION OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

Read before the Section on Sanitary Engineering, American Public Health Association, Jacksonville, Fla., November 30–December 4, 1914.

Part I.—On Sewage Works Operation.

INTRODUCTION.

The introduction of sewer systems into modern cities whereby the wastes of domestic life and industry are discharged into water courses has brought about the need for the treatment of sewage in order to accomplish two purposes:

(a) To promote the comfort and convenience of the people by maintaining water courses in a decently clean condition, that is, free from nuisance to sight or smell so as to be fit for civic development, industry and recreation.

(b) To aid in protecting the public health, when necessary, by maintaining watercourses as fit sources of water supply after adequate purification or for the cultivation of shell fish.

The initiative for installation of sewage treatment works usually is either

(a) The recognition by a community of the fact that nuisances in water courses retard municipal developments, deprive the citizens of their use of the streams and offend common decency.

(b) An order from a properly empowered body for the installation as a sanitary measure for the protection of the users of the watercourses.

The design and extent of the works and the degree of treatment required should be such as to promote economy of funds in order to give the greatest benefit to the largest number of people at the least cost.

Based upon these premises, the operation of a sewage treatment works may be judged by the following standards:

(a) Prevention of nuisance either at the works or in the body of water receiving the effluent.

(b) Protection to the public health, *e. g.*, in reducing the pollution in a water course to relieve the load on a water purification plant.

In the following discussion it is assumed that under the guidance of competent sanitary engineers the specific problem has been studied, resulting in the design and construction of efficient sewage treatment works and

TESTS FOR DETERMINING THE COMPOSITION OF CRUDE SEWAGE FOR COMPARISON

OCCASIONAL COMPOSITE SAMPLES TO BE ANALYZED FOR NITROGEN AS ORGANIC AND AS FREE AMMONIA
TEST FOR SUSPENDED MATTER CALLED Y IN REPORT
AND CHLORINE
AT SAME TIME SAMPLES TO BE EXAMINED FOR AVIDITY FOR OXYGEN TEST CALLED X IN REPORT

FOR SEWAGE TREATMENT WORKS PRIMARILY DESIGNED TO PREVENT NUISANCE

TYPE OF WORKS	TESTS FOR OPERATING CONTROL AND DETERMINATION OF EFFICIENCY					TESTS TO DETERMINE SUFFICIENCY OF TREATMENT
	INFLUENT AND EFFLUENT OF PRELIMINARY PROCESSES	SLUDGE DRAWN FROM ONE STORY TANKS	SLUDGE DRAWN FROM TWO STORY TANKS	EFFLUENT OF OXIDATION PROCESS	FINAL EFFLUENT AS DISCHARGED INTO THE RECEIVING BODY OF WATER	RECEIVING BODY OF WATER
WORKS CONSISTING OF PRELIMINARY PROCESSES ONLY SUCH AS FINE SCREENS OR SEDIMENTATION	① TEST FOR THE AVIDITY FOR OXYGEN CALLED X IN TEXT ② TEST FOR SUSPENDED MATTER CALLED Y IN TEXT	① SPECIFIC GRAVITY ② PERCENTAGE MOISTURE IN WET SLUDGE ③ PERCENTAGE OF DRY RESIDUE THAT IS VOLATILE	④ REACTION OF WET SLUDGE		① TEST FOR AVIDITY FOR OXYGEN CALLED X IN TEXT. ② TEST FOR SUSPENDED MATTER CALLED Y IN THE TEXT.	① DISSOLVED OXYGEN. ② TEST FOR AVIDITY FOR OXYGEN CALLED X IN TEXT.
WORKS CONSISTING OF PRELIMINARY AND OXIDATION PROCESSES SUCH AS CONTACT BEDS OR PERCOLATING FILTERS				① NITROGEN AS NITRATES. ② TEST FOR THE AVIDITY FOR OXYGEN CALLED X IN TEXT ③ DISSOLVED OXYGEN ④ RELATIVE STABILITY *	① TEST FOR AVIDITY FOR OXYGEN CALLED X IN TEXT. ② NITROGEN AS NITRATES. ③ DISSOLVED OXYGEN ④ TEST FOR SUSPENDED MATTER CALLED Y IN TEXT. ⑤ RELATIVE STABILITY. *	

* IN SMALL PLANTS NOT PROVIDED WITH A LABORATORY RELATIVE STABILITY MAY TAKE FIRST PLACE.

FOR SEWAGE TREATMENT WORKS PRIMARILY DESIGNED TO PROTECT SOURCES OF WATER SUPPLY

TYPE OF WORKS	TESTS FOR OPERATING CONTROL AND DETERMINATION OF EFFICIENCY					TESTS TO DETERMINE SUFFICIENCY OF TREATMENT
	INFLUENT AND EFFLUENT OF PRELIMINARY PROCESSES	SLUDGE DRAWN FROM ONE STORY TANKS	SLUDGE DRAWN FROM TWO STORY TANKS	EFFLUENT OF OXIDATION PROCESS	FINAL DISINFECTED EFFLUENT AS DISCHARGED INTO THE RECEIVING BODY OF WATER	RECEIVING BODY OF WATER
WORKS CONSISTING OF PRELIMINARY PROCESSES AND DISINFECTION	① TEST FOR THE AVIDITY FOR OXYGEN CALLED X IN TEXT ② TEST FOR SUSPENDED MATTER CALLED Y IN TEXT.	① SPECIFIC GRAVITY ② PERCENTAGE MOISTURE IN WET SLUDGE ③ PERCENTAGE OF DRY RESIDUE THAT IS VOLATILE	④ REACTION OF WET SLUDGE		① PRESUMPTIVE TEST FOR B COLI. ② TEST FOR AVIDITY FOR OXYGEN CALLED X IN TEXT. ③ TEST FOR SUSPENDED MATTER CALLED Y IN TEXT.	① PRESUMPTIVE TEST FOR B. COLI. ② DISSOLVED OXYGEN. ③ TEST FOR AVIDITY FOR OXYGEN CALLED X IN TEXT
WORKS CONSISTING OF PRELIMINARY AND OXIDATION PROCESSES AND DISINFECTION				① NITROGEN AS NITRATES. ② TEST FOR AVIDITY FOR OXYGEN CALLED X IN TEXT. ③ DISSOLVED OXYGEN. ④ RELATIVE STABILITY. *	① PRESUMPTIVE TEST FOR B. COLI. ② TEST FOR AVIDITY FOR OXYGEN CALLED X IN TEXT ③ NITROGEN AS NITRATES ④ TEST FOR SUSPENDED MATTER CALLED Y IN TEXT. ⑤ RELATIVE STABILITY. * ⑥ DISSOLVED OXYGEN.	

WITH REPORT OF COMMITTEE ON SEWAGE WORKS OPERATION AND ANALYTIC METHODS. A-P-H-A - NOVEMBER 1914.

upon the completion the owner is confronted with the problem of its operation and maintenance.

One of the first and most important matters to be considered in the operation of a sewage treatment works is the heterogeneous nature of sewage. Its composition varies widely in different towns, influenced by the ways of living and amount and kind of industrial wastes. Some works receive a sewage so fresh that original fæcal matter, paper and fats are practically unchanged, while in others the solids have disintegrated and partly dissolved.

The hourly character and composition of the sewage may also vary from day to day, being uniform in one place and different in another. During storms the sewage collected by a combined system of sewers is increased in volume and its composition changed to a very marked degree.

Many of the forces of nature are utilized in sewage treatment in an involved and complex manner. Gravitation is utilized in sedimentation and in the hydraulics of the flowing liquids; chemical reactions occur in the use of precipitants, in disinfection and in the changing combinations of sewage materials; and biological forces are active in the digestion of sludge and in the oxidation of the dissolved organic matter.

In successful operation all of these factors must be controlled. It is, therefore, self-evident that sewage treatment works, particularly of any size, cannot be made automatic, but require constant observation and supervision by trained, skilled operators in order to accomplish the purpose for which the plant was installed and the funds invested.

SUPERVISION.

The degree of technical skill required depends upon the following factors, but not necessarily in the order given:

(a) The magnitude and design of the works.
(b) The processes used.
(c) The composition of the sewage treated.
(d) The receiving body of water.

It does not always follow that because a sewage treatment works receives a large volume of sewage that the responsibility is in proportion to the magnitude, because the processes used may be simple and the dilution of the effluent large. Some small works, for particular purposes, *e. g.*, fat recovery, may require very expert supervision.

The use of biological works for oxidation or the use of disinfection always requires more attention than simple sedimentation. Emscher tanks which include sedimentation and sludge digestion in a single device require a higher degree of skill to operate than plain sedimentation tanks. The presence of considerable volumes of trade wastes in sewage usually introduces difficulties not encountered with ordinary domestic sewage.

Constant attendance upon a sewage plant for a private estate or small institution is unnecessary. Such plants should be simply designed, so that an employee with other duties is required to give but a small part of his time to the care of the plant. But in such cases successful results are not always obtained unless the designing engineer or some competent person is called in at regular times to inspect and advise concerning the technical details of operation. Such inspections are particularly important during the early life of the plant to train the attendant to observe and interpret the conditions which require attention.

For the larger institutional plants and works for small towns more skilled attendants are required and the need for competent supervision more urgent.

In municipal sewage treatment works of any magnitude the constant services of a scientifically trained man in charge is practically essential to success. The larger volumes of sewage treated afford greater potentialities for the creation of nuisance from bad odors if the works are not constantly kept in the best condition. The effect upon the receiving body of water is also greater and a deterioration in the quality of the final effluent may allow the development of conditions such as nuisance in the water course or danger to water supplies which it is the very function of the works to prevent. And finally it is economical to pay a liberal salary to the right kind of man to keep the annual charges for operation and maintenance at a minimum figure by business-like management.

RECORDS.

The keeping of careful, thorough and neat records of operation is essential to efficient operation. State authorities charged with supervision over the condition of the water courses should require a uniform record. Such records from the operating point of view show the effect of changing methods of operation and enable the selection of the most efficient and economical procedure. Complaints of citizens can frequently be answered and explained away by reference to the records, and often well-kept records have prevented suits or lessened damages.

As an example of the value of records, two different hypothetical cases may be cited: A sewage treatment works required to prevent the creation of nuisance in a stream not used nearby as a source of water supply. Here records of the stage and conditions of the stream and condition of the final effluent may show that less than complete treatment would be sufficient during a portion of the year and the saving in labor of operation materially reduce annual operating charges and still the plant would efficiently perform the function for which it was installed.

On the other hand a plant whose purpose is primarily intended to protect the nearby source of water supply requires most careful records, so that in case of the failure of the water purification plant to produce a wholesome water the responsibility cannot be placed upon the sewage treatment works.

Records to be really valuable should not be cumbered with useless data. The essentials should be carefully determined and made graphic wherever possible.

NEATNESS.

Too much stress cannot be laid upon the importance of neatness and cleanliness in and around the works and the surrounding grounds. To accomplish its purpose this cleanliness must begin in the sewer system, for accumulation of decomposing matters therein will surely hasten decomposition to such a degree that at times no amount of care at the works can prevent the dissemination of bad odors. The cleanliness begun in the sewers should be carried out through the plant and no filth should be allowed to accumulate, but it should be promptly disposed of.

But small expense is involved in laying out flower beds or shrubbery especially at the entrance and to serve as a screen around unsightly parts of the works. A moderate amount of attention to these details removes the inherent prejudice in the mind of the visitor or passerby.

DETAILS.

The above sets forth only the broad principles underlying successful operation; for the details of operation attention is called to a series of articles entitled, "The Operation of Sewage Disposal Plants" published at monthly intervals during the current year in the *Municipal Journal.*

Part II.—On Analytical Methods.

INTRODUCTION.

The latest edition of "Standard Methods of Water Analysis" of the American Public Health Association supplies sanitary engineers, chemists and bacteriologists with a nearly complete set of analytical procedures, many of which are of assistance to sewage works operators; they do not, however, state which of the many tests described are most useful for the practical purpose of sewage works operation.

Certain tests are, therefore, submitted herewith and their use and relative value commented upon. The following outline of recommended tests has been prepared in the light of modern sewage investigations rather than by following established practice in water analysis; it is the result of careful thought, based on experience in the actual operation of sewage treatment works.

Different works obviously require the use of different sets of tests for their study and control, based upon peculiar needs and conditions and, therefore, no definite set of tests can be laid down to suit all conditions. For example, a plant for preliminary treatment only, such as fine screening or sedimentation, might well be operated without any consideration of the amount of nitrate present in the sewage at any stage; but in the operation of bacterial processes, such as sprinkling filters, the formation of nitrate is of prime importance to indicate the efficiency of the filter.

Hence, the outline of tests submitted is to be considered as broadly suggestive and not as a specification for every conceivable condition.

Laboratory facilities are frequently limited and help lacking, so that it is impossible to carry on extensive investigations. The tests recommended are, therefore, limited to the most important and useful, realizing that where opportunity exists other work will be carried on, as in the case of testing stations.

COLLECTION OF SAMPLES.

Due to its heterogeneous nature, the composition of crude sewage is very variable and chance samples taken at short intervals of time will, upon analysis, yield very different results; but when the sewage is submitted to increasing refinements of treatment, this variability in composition is lessened. It is, therefore, advisable for all tests in which the samples can be properly kept for a time before analysis, to obtain a composite sample made up of a number of small portions and thus automatically obtain an average sample for analysis. To do this properly, the size of the individual portions should be proportional to the rate of flow of sewage at the time of sampling, but it is recognized that with the class of labor usually available at sewage treatment works, this ideal cannot be realized. The frequency of sampling will largely depend upon the available force at the plant. Crude sewage should be sampled at more frequent intervals than effluents of refined processes of treatment.

It is of great importance for the proper interpretation of published data, that in connection with reported analyses a statement be made of the frequency of sampling and whether the figures given are, for instance, the average of certain chance samples or the averages of continuous composite sampling.

COMMENTS ON TESTS RECOMMENDED.

Test X.—By this designation is meant a test for measuring by incubation the avidity of the sample of sewage or effluent for dissolved oxygen or its equivalent. The Royal Commission on Sewage Disposal developed a technique for such a test (see Sect. 2, Vol. 11, Appendix, 8th Report 1913 or *Engineering Record*, October 25, 1913, page 453). Another method was developed by Mr. C. B. Hoover and is in use at the sewage treatment works at Columbus, Ohio (see *Engineering News*, May 28, 1914, page 1187) and still another has been devised by Dr. Arthur Lederer and is in use in the laboratories of the Sanitary District of Chicago (see *Journal Infectious Diseases*, May, 1914, and paper to be presented by him to the Laboratory Section A. P. H. A. at these meetings). At present, a Committee of the Laboratory Section is about to propose a provisional procedure for such a test.

This test is considered to be of prime importance; but as there is, as yet, no definitely recognized technique nor name it is here indefinitely designated by the symbol X.

For the present it is *urgently* recommended that some form of the test be used even though all workers may not agree on the exact procedure to adopt.

Test V.—By this designation is meant a test for measuring not only the amount but also the condition and physical characteristics of the suspended matter in sewage.

Suspended matter was first determined by the difference in the weight of the residue upon evaporation of a portion of the sample filtered through paper and another unfiltered. At the present time, the Gooch Crucible is generally used to obtain the weight direct. In both procedures the organic portion of the suspended matter was estimated by determining the loss of weight upon ignition. The Royal Commission on Sewage Disposal attempted to devise a method for determining the amount of suspended matter by means of the centrifuge. In the works of the Emschergenossenschaft a simple field method is in use for determining the bulk of the settleable matter by subsidence in graduated conical glasses.

None of these methods, however, furnish information concerning the size, physical condition or other characteristics so essential to know in the preliminary treatment of sewage. One of the reasons for this is the small size of the sample examined and the difficulties of obtaining a representative portion for analysis; for the inclusion or exclusion of a large-sized piece of suspended matter in a small-sized sample will cause large variation in the result obtained.

The efficiency of all preliminary processes depends upon the removal of the settleable solids and, therefore, a test to measure them is of great importance.

It is, therefore, recommended that in sewage works operation some procedure for the determination of suspended matter be used and that analysts be urged to devise a technique to supply the information required.

Nitrates.—This test is very useful because its place in the interpretation of analyses is well understood and it is a delicate indicator of the activity and efficiency of oxidation processes. Moreover, the results are available within a comparatively short time after the samples are taken.

Dissolved Oxygen.—This test is of great value because of the light it throws on the condition of the receiving body of water. Its use is recommended also in connection with effluents from oxidation processes.

The amount of dissolved oxygen present in a stream at any particular place or time, or in an effluent, should, however, be considered in connection with either the results of the test designated X or relative stability, for the presence in the sample of sufficient decomposable matter might exhaust in a short time the dissolved oxygen found by the analysis.

Relative Stability—Methylene Blue.—This test has a definite value in connection with the dissolved oxygen and nitrate tests in explaining the records of past operation, but its greatest value is as a control for small works. Obviously, many small works cannot be kept under the continual observation of a trained chemist or engineer and in such cases the relative stability test can be readily made by an attendant incapable of the more elaborate procedures. Under these conditions relative stability is of primary importance and its daily use is strongly recommended in preference to occasional tests of other kinds.

Caution should be used in regard to the relative stability of tank effluents, sterile effluents or effluents containing certain industrial wastes.

Tests of Sludge.—

(a) Specific gravity.
(b) Percentage moisture.
(c) Percentage of the dry residue that is volatile.
(d) Reaction—Alkalinity or acidity.

These tests made on sludge especially from two-story tanks and separate sludge digestion tanks are of great value in operation, as they interpret the biological digestion of the organic matter. The reaction test is particularly important as an aid in detecting the cause and pointing out the remedy for poor sludge production. It has been found that tanks producing bad sludge can be made to produce good sludge by adjusting the reaction from acid to alkaline.

In sludge obtained from fine screening it is advisable to determine the weight per unit volume and percentage moisture.

Bacteria—Presumptive tests for B. Coli.—For sewage treatment works intended solely to prevent nuisance in water courses, tests for bacteria are superfluous.

They are, however, of the utmost importance in cases where the works are intended to protect sources of water supplies or shellfish layings.

It is unnecessary to carry on the confirmatory tests for B. Coli used in water works control, as the presumptive tests are much simpler and more conservative.

The formation of gas or the red colonies having appearance of B. Coli on Litmus lactose agar at 37° are both in successful use for this purpose.

When used, the test should primarily be made on the receiving body of water and secondarily on the effluents from disinfection processes.

TESTS OF CRUDE SEWAGE FOR COMPARISON.

For the purpose of record and comparison it is advisable to make at intervals tests upon composite samples of the crude sewage received at the works. These tests should indicate the character, condition and strength of the sewage.

It is recommended that at least the following determinations be made:
(1) Test for suspended matter called Y above,
(2) Test for avidity for oxygen called X above,
(3) Nitrogen as organic,
(4) Nitrogen as free ammonia,
(5) Chlorine.

Special cases may require other tests to show the characteristics of the sewage.

Particular attention is called to the notes on Test X, dissolved oxygen and bacteria in connection with the receiving body of water. Tests when applied to sewage and effluents are of value as tools for operating control, but as a measure of sufficiency of treatment they do not always supply adequate information. This is on account of the difficulty of formulating precise standards for effluents discharged into different kinds of receiving bodies of water, and, therefore, the final criterion of sufficiency of treatment must logically rest in the effects produced upon the receiving body of water considered in the light of expediency and local needs. Investigations of the effects of effluents on bodies of water are, therefore, urgently recommended.

For the different purposes of operating control, determination of efficiency and determining sufficiency of treatment, the tests commented upon above are grouped in a diagrammatic table submitted herewith.

CONCLUSION.

The Committee wish to express their thanks and appreciation to Mr. F. E. Daniels for valuable services rendered in the preparation of this report.

One of the functions of this Committee is coöperation with the Laboratory Section. It is, therefore, recommended that the proper committee of that Section take up for consideration the improvement of the test for suspended matter in sewage called Y in this report and that during the coming year analysts direct their attention to the simplification and standardization of the test for avidity for oxygen called X in this report.

The Committee consider Part II as a progress report and request engineers and chemists in charge of sewage treatment works to send their views and criticisms of the outline of tests to the Chairman of the Committee (address 412 City Hall, Philadelphia, Pa.), in order that complete data may be collected and a final report submitted next year.

Respectfully submitted,

C. B. Hoover,
H. C. McRae,
Langdon Pearse,
George C. Whipple,
W. L. Stevenson, *Chairman.*

Book Review.

Overcrowding and Defective Housing in the Rural Districts. *By Dr. Harvey B. Bashore. New York, 1915, John Wiley & Sons, Inc. Price, $1.00 net. Cloth, 92 pages, 12 mo., 15 full page half-tones.*

This little volume should prove an eye-opener to many a layman, and perhaps even to some city physicians who have accepted without question the old belief, once founded upon fact, that country life is more wholesome than city life. That country life can and should be more wholesome than city life is not the question. Health reports show that New York City, by tremendous exertion along many lines, by raising the living standards of its people, has reduced its death-rate until it is below that of the remainder of the state. The remainder of the state, however, contains many cities, several of large size. The easy-going may jump to the conclusion that it is they which keep the state's death-rate high. Unfortunately there are among them some which do contribute more than their share toward this undesirable result; but the small towns, the villages, even the open country have small reason to complain of unfairness in being lumped with these recalcitrants in the statistics of the metropolis. Knowledge of the principles of sanitation, vigor in administering health laws and regulations have partially overcome the handicaps due to a crowded population; ignorance and slackness have largely neutralized the advantage of conditions fundamentally good.

The surprising thing in Doctor Bashore's book is the great similarity he finds between bad housing in the city and bad housing in the country. We have been so accustomed to hear excuses for bad city housing based upon the plea that land overcrowding is inevitable in great centers of population that it is to be hoped the title of Doctor Bashore's first chapter may have a wholesomely awakening effect. It is, "Land Overcrowding." In "a typical rural farming community, inhabited by native born Americans"—even the time-honored excuse of the immigrant is not available—he found the greatest and most difficult problem of urban housing.

Of course those who have studied city building know that the presence of this problem is not inevitable, that it is simply due to ignorance, lack of foresight and lack of efficient control over real estate development. But it is much easier to find an excuse after a mistake is made than it is to discover the reasons for the mistake and to take effective means to prevent its repetition. Moreover our first housing studies were made in large cities. The students have, as beginners must, supplemented their knowledge by assumptions. So it was quite natural to assume that a practice so generally condemned as land overcrowding could have been accepted only through what was thought to be necessity. Similar assumptions were made in the past by reformers who told us that New York would never have developed its barrack tenements had Manhattan Island not been surrounded by rivers which prevented the spread of population, and by reformers of the present who tell us that an adequate rapid transit system will overcome these barriers and partially at least empty the lower East Side into garden set cottages. Of course if they knew such towns as Lawrence, Mass., with its closely packed *alley* tenements on one side of its factories and open fields within a few minutes walk on the other side, they might not be so confident.

Doctor Bashore will shake their confidence still more. He describes the "row" occasionally found in Pennsylvania—and other—villages, "adjoining these narrow village streets as much land is covered relatively with buildings, as in the city."

The title of the second chapter will occasion scarcely less surprise than that of the first. It is "House and Room Overcrowding." What becomes of the tradition that it is the alien, particularly the Italian and the Pole, who is at the root of this problem in our cities, for here is a community "inhabited by native born Americans." Take one instance. "A nurse from one of the state dispensaries in her visiting work, came across a certain farm house where five people were accustomed to sleep in one not very large

bedroom, which had only one small window, and even that was nailed shut; one of these five had incipient tuberculosis. These people were well-to-do farmers living in a large twelve-room stone house, and simply crowded into one room for the sake of mistaken economy—presumably to save coal and wood."

The other three chapters are: "Defective Building," "Overcrowded and Defective Schools," and "Results." Chapters three and four probably contain no element of surprise, for even the layman of the city has spent vacations in the country and has read of the farmer who comes to town because of the better schools. Chapter five contains evidence of the results of bad rural housing, especially the high death-rate from tuberculosis, and "a very short word about the remedy for overcrowding and bad housing in the country." This work, which is not so very short, from any point of view, is "education."

Doctor Bashore's little book is a contribution of value, for it presents facts which have been too little known. These facts are of worth not only to those who are dealing with the betterment of rural conditions, but also to those whose interest is in cities. They call the attention of the former to underlying causes which must be changed before permanent advance is possible. They call the attention of the latter to the fact that conditions against which they are fighting are not peculiar to cities and so can not be altered merely by securing certain modern improvements, such as rapid transit.

John Ihlder.

A Manual for Health Officers. *By J. Scott Mac Nutt. First Edition. 660 pages. New York, John Wiley & Sons, Inc.; London, Chapman Hall, Limited, 1915. Cloth, $3.00, Net.*

It is with the sense of having at last found a long-needed counsellor that one follows the author in this most valuable addition to the literature of sanitary science. One realizes that, for the first time perhaps, a gap has been bridged, not only between the older empiricism, which clings so tenaciously to the fabric of health regulations and procedures based on more definite knowledge, but one between the application of the more scientific principles of health conservation and the means at his disposal as provided in many localities.

The chapters on the organization of health departments, their relation to the public, to unofficial organizations and to the demands of a science that has been revolutionized in a generation, are models of clear conceptions of present needs, of a proper relation of available opportunities and present a strong argument for better coöperation among existing health agencies.

A perusal of Chapter V dealing with the essential differences of the "new public health" and former conceptions would be distinctly beneficial to all members of health boards and legislative bodies. Here is a well-balanced and pleasing presentation of the possibilities in the prevention of premature mortality, standardizing, as it were, causes of death and well indicating the relative value of old and new methods, a valuable guide to communities that must carefully consider each expenditure.

Under Public Health Administration, well-tried systems of record-keeping are given, the newer theories of infection outlined and the need of careful epidemiological studies properly emphasized. In covering the various communicable diseases, due regard is paid to cases and carriers—to contact; yet only reasonable requirements are outlined, nor is the student left stranded at the ultimate ramifications of impractical theories. The bearing of control regulation on all affected by them is dealt with judiciously, for the greatest good of the whole and the expenditure of the health dollar as outlined by Mr. Mac Nutt should purchase a hundred cents' worth of health protection.

A criticism might possibly be made of the rather sweeping advice on the employment of immunizing doses of diphtheria antitoxin among exposed persons (p. 137). In view of possible anaphylaxis it might be well to govern this use of antitoxin by the application of the Schick toxin reaction for immunity or even, in view of the relatively feeble infectiousness of this disease, omit it entirely where contacts may be kept under expert supervision and symptoms be thus recognized early.

The author does not consider tetanus neonatorum, though its occurrence in certain sections of the country would indicate the advisability of official control.

The failure to mention the more recent work

of Goldberger on the dietary origin of pellagra is due probably to an oversight.

The true relation of schools to communicable disease and the important place of school medical inspection and child hygiene, in well organized health departments, is admirably outlined.

Adapted especially to the needs of the executive officer, are the chapters on milk and other foods, water supplies, housing and industrial hygiene. Sufficient information is supplied to establish their correct status in health administration without burdening the reader with details that belong more to the text-books of the laboratory worker.

A working basis of vital statistics, as well as valuable hints for better registration, are given in Chapter IX and the sane application of publicity to departmental work completes this altogether well-rounded manual.

Wherever details are omitted in the text, supplementary information is to be found in the appendices or may be sought in the abundant references given.

The health officer who has acquired some degree of proficiency through bitter experiences will recognize the advisor he has long needed and the one first entering upon the manifold and complex duties which must be assumed, if his community is to receive sound guidance in all that makes for better sanitation, will, many times, consult this volume with profit and relief engendered of its clear outlining of the best in the great modern movement of public health.

It will serve at once as an inspiration to those fitted to undertake the responsibilities of health administration and, not less important, will serve to deter any who might consider lightly the obligations attendant upon the proper execution of their duties.

It is truly a manual for health officers and as such answers clearly many of the vexatious problems that continually present themselves to the practical sanitarian.

C. E. Terry, M. D.

Personal Notes.

The following were elected to membership in the American Public Health Association on July 28, 1915:

Mrs. Wm. Lowell Putnam, Manchester, Mass.

Major James Wallace Van Dusen, Washington, D. C.

Major Robert Ernest Noble, Washington, D. C.

Mr. Adolph Lewisohn, New York City, N. Y.

Mr. Isaac N. Seligman, New York City, N. Y.

Mr. Clair Elsmere Turner, Boston, Mass.

Mr. Frank H. Mann, New York City, N. Y.

H. M. Lancaster, B. A., Sc., Toronto, Ontario.

Dr. Ralph W. Elliot, Cleveland, Ohio.

Dr. Frederick R. Green, Chicago, Ill.

Mr. Tracey W. McGregor, Detroit, Mich.

Mr. James Jenkins, Jr., Brooklyn, N. Y.

Mr. Frederick Sprenger, Bronxville, N. Y.

Miss Jennie M. Hixon, Brooklyn, N. Y.

Miss Louise Lee Schuyler, Highland Falls, N. Y.

Miss Edna L. Foley, Chicago, Ill.

Dr. Charles Albert Griffin, East Orange, N. J.

Miss Mary Louise Mark, Westerville, Ohio.

Mr. Ernest D. Easton, Newark, N. J.

*

Dr. Francis X. Mahoney, who has for some time been chairman of the Boston City Board of Health, has been appointed commissioner under a recent ordinance authorizing the reorganization of the department under a single head.

*

Dr. J. W. M. Bunker has resigned his position as Instructor in Sanitary Engineering in Harvard University and has accepted a position with the Digestive Ferments Company of Detroit.

*

Dr. W. A. Evans is foreman of the coroner's jury which is investigating Chicago's excursion steamer disaster.

Health Department Reports and Notes.

REPORTS.

Pueblo, Colorado.

The report of the health, inspection and sanitation department of Pueblo for 1914 is the first report issued by Dr. John G. Wolf, the new chief of the department. When Doctor Wolf took charge of the work he found it poorly organized and for his first task he took the systematization of the work and the introduction of an adequate system of records. A card index has been installed which includes all the various branches of work with which the department is concerned. In addition to this important step a laboratory was installed in which both diagnostic work and chemical and bacteriological analysis of milk is carried on. Regular inspection of milk, meat, and other foods was also introduced. It is planned to still further improve the work of the department by introducing civil service and competitive examinations for the employees.

Although mining and steel mills furnish employment to many of the citizens of Pueblo and there is a large foreign element in the population, the combination of the Colorado climate and the activity of the health department appear to keep conditions exceptionally good. Statistics are given comparing the death-rates in Pueblo for 1914 with the rates for the period from 1905 to 1909 and with the rates for the remainder of the United States in 1912. These show that conditions in Pueblo are improving rapidly and are better than they are in the rest of the country. The general death-rate was 12.45 as compared with 15.77 for the 1905–1909 period and with 13.9 for the registration area for 1912. Curiously enough, although the tuberculosis rate is low in a state which attracts many consumptives, its pneumonia and whooping-cough death-rates are abnormally high.

Pueblo has had a bad reputation as a typhoid city until recently when supervision of the milk and food supplies and hypochlorite treatment of the city water supply have caused the rate to fall rapidly until it is now below the average.

Considerable difficulty has been experienced in the past in the satisfactory solution of the garbage problem. Several men were accustomed to collect the garbage and feed it to hogs. They were not licensed and collected where they pleased and when they pleased so that some sections of the city were entirely neglected. Now each garbage man is required to take out a permit and to abide by certain regulations as to the collection and subsequent disposal of the garbage. He is then assigned a certain district in the city and required to collect from that district completely and regularly. Failure to abide by the agreement may lead to the withdrawal of the permit.

The report is well prepared and readable to the general public, for whom it is planned. The report of vital statistics might be made more complete for the sake of reference and comparison with other cities but a large tabulated report is of course more useless than interesting to the average reader. The financial report shows an expenditure of about thirty-seven cents per capita population for the work of the department.

Clinton, Massachusetts.

Clinton is a town with a population of less than 13,000 but its health department might well serve as a model to cities many times its size. The methods used have always been progressive and it may point with pride to having been among the first to adopt the score card system of dairy inspection, first to make use of the standard form of annual report prescribed by the Massachusetts Association of Boards of Health, and among the first to make up many other of the modern methods in public health administration.

The personnel of the department includes an agent, a clerk, a bacteriologist, a plumbing inspector, a milk inspector, a district and dispensary nurse and a food inspector. Naturally

in a town of Clinton's size it is unnecessary for these to be all full-time workers but they have apparently been unusually fortunate in their choice of employees.

The contagious disease situation was marred by an epidemic of scarlet fever in the early part of the year but aside from this it was kept in good control. An isolation hospital is maintained by the town when necessary, and a dispensary for the diagnosis of tuberculosis and for vaccination is also maintained.

Regular inspection of milk and dairies is carried on and the use of educational methods combined with the score card has brought about a considerable improvement in the supply. In the milk show at Worcester the milk supply of Clinton ranked sixth among the towns represented. Of 244 samples of milk taken from wagons by the milk inspector during 1914 and the early part of 1915 only two showed more than 70,000 bacteria per cubic centimeter.

The birth-rate in Clinton was 27.45, the death-rate 12.08 and the infant mortality rate 117 per thousand births. The expenditures of the board of health for the year amounted to about fifty-one cents per capita.

United Fruit Company Medical Department.

While it is unusual to treat private corporations in this section, a departure now and then is only a fair recognition of the fact that in some parts of the world the public health depends largely upon the activities of private business concerns.

The report of this great corporation's medical department covers 125 pages and is bound up in a booklet presenting much the same appearance as the average city health department report.

This report is composed almost entirely of statistics, except for the letters of transmittal from the various division superintendents, and is therefore a bit disappointing to one who would be interested to learn more of the conclusions reached by the sanitarians of the company as a result of their year's work under the generally adverse conditions which tropical climates produce.

It appears in the general statement that the total number of patients receiving treatment in the company's dispensaries, hospitals and steamships during the year was 127,809, and the average number of employees and others, who were dependent on the company for medical service during the year, was 71,910.

The company maintains a hospital and dispensary service in each of its divisions. These are scattered through the West Indies and the northern portion of South America. And in addition to this, it exercises a sanitary supervision over numerous villages occupied by its employees. The following statement, concerning the village and district of Changuinola in the Bocas del Toro (Panama) Division, is more or less typical:

"Changuinola.—The village and entire district is well drained and comparatively healthy, except for malaria. All offices and residences of white employees are well screened and kept in repair, laborers' quarters cleaned, well ventilated and dry. Grass and bush are cut once per month throughout the village and around all farmhouses.

"The sewerage system is complete and in repair. We have an adequate supply of pure water. The company operates an ice plant in Changuinola Junction, using distilled water. Ice is supplied to employees three times per week.

"Garbage is collected daily and carried by train to a suitable dump and burned. The district is inspected at regular intervals by a competent sanitary officer."

NOTES.

Letting the Public Know What to Do.—The "General Information" below is from Vol. 1, No. 1, *Monthly Bulletin of the Department of Health of Dallas, Texas.*

This information is extremely important; every householder and housewife should know every one of these items and every individual adult in the city should know part of them. A bulletin of this sort is not likely to circulate as widely as it should. In some cities a card, containing a list of fire alarm boxes, is placed in every house. The information given on page 949

might well be distributed in the same way. Mr. Charles Saville, the newly appointed director of sanitation of Dallas, is in charge of the publication of this excellent bulletin.

GENERAL INFORMATION.

Information Desired Regarding	*What To Do.*
Admission of Patients to City Hospital	Phone Dr. M. M. Carr, Resident Physician, S. W. Prest 2144, Auto. A. 1143
Emergency Cases	Phone Emergency Hospital, S. W. Main 4565, Auto. M. 4565 and M. 6030
Fumigation of Premises following Communicable Diseases	Phone Registrar of Vital Statistics, S. W. Main 8000, Auto. M. 6034
Records of Births, Deaths, and Cases of Disease	Phone Registrar of Vital Statistics, S. W. Main 8000, Auto. M. 6034.
Quality of Milk from any Dairy	Phone City Chemist, S. W. Main 8000, Auto. M. 6016.
Examination of Sputum, Blood Samples, Diphtheria, Cultures, etc.	Phone Dr. E. S. Fortner, S. W. Prest. 2144, Auto. A. 1143
Reporting of Unsanitary Premises and General Nuisances	Phone Director of Sanitation, S. W. Main 8000, Auto. M. 6019
Garbage and Refuse Collection	Phone Supt. of Refuse Collection and Disposal S. W. Main 8000, Auto. M. 6045
Cleaning of Dry Closets	Phone City Scavenger, S. W. Main 8000, Auto. M. 6039

✻

The Black Hand.—*The Virginia Health Bulletin* for May is devoted entirely to typhoid. On the cover is the injunction, "Beware the Black Hand" over which the "hand" appears. The thumb is Filth; the fingers are Bad Water, Bad Milk, Carelessness and Flies. Several diagrams of sanitary privies and safe wells add to the usefulness of the pamphlet.

✻

A City Milk Supply.—In the editorial columns of *The Western Medical News* for June, 1915, is the announcement of a new experiment in municipal ownership.

"In recent years a great improvement has been made in the quality of the milk supplied in most of our larger cities. This is chiefly owing to the education of our people—a more intelligent and enlightened population requiring a higher standard and a purer supply. It was brought about by the vigilance of our health departments, by means of frequent inspections and numerous tests. Much still remains to be done.

"The city of Jamestown, N. Y., is grappling with the problem in a new way. It purpose making the supplying of milk to the citizens a municipal affair. The mayor is one of the leaders in the movement. The whole plant is to be owned, operated and inspected by the city. Under the old system we sometimes see three or four men delivering milk in the same city block. Under the new system this is done away with. One man will be given a certain section of the city where he will deliver milk, somewhat similar to the present delivery of mail.

"The city will own all the dairies and there will be a central depot for the testing, pasteurizing and bottling of milk.

"By the new system it is hoped to prevent overlapping, to eliminate waste and to furnish to the citizens an ample supply of pure milk at the lowest possible cost."

✻

Chicago's Municipal Sanitarium.—One of the finest municipal sanitariums in the world was opened by the city of Chicago on March 8, 1915. It has been under construction since December 11, 1911. The grounds are 160 acres in extent and will ultimately contain 28 cottages—20 for adults and 8 for children. Its present capacity is 950 beds and the staff is in a position to care for about 1,500 to 2,000 patients annually. Liberal provisions have been made for completeness. There is a maternity department, a nursery for infants of prospective tuberculous mothers, open-air quarters for employees, 10 municipal tuberculosis dispensaries, 35 dispensary physicians and 54 field nurses.

✻

Emulsions as Larvicides.—"The following interesting statement as to the method of action of emulsions of crude carbolic acid as larvicides is an extract (Jan. 1915, p. 8) from the Report of the Department of Public Health of the Panama Canal:

"The emulsions as they are prepared with rosin soap are suspensions of minute particles which, when external influences are eliminated, must

be considered to remain unchanged in composition regardless of the dilution. As they are formed when the proportion of water to the undiluted liquid is approximately 2 to 1, each particle must contain a relatively high proportion of toxic substances.

"The emulsions behave as typical emulsoid colloids. The particles display an energetic Brownian movement; with a membrane permeable to electrolytes, they exert a definite osmotic pressure; and they also carry a negative charge of electricity, migrating to the positive pole under the influence of an electric current; when this charge of electricity carried by the particles is removed the emulsion is destroyed. The electrical nature of the particles is essential to their existence, and it is also a factor in the suppression of the specific chemical nature of the substances composing them. It also is very closely connected with the high bactericidal value of such emulsions.

"Bacteria possess this same electrical property, but with this difference, the nature of the charge is very easily reversed. In an alkaline medium it is electronegative, and in an acid medium it is electropositive. In the presence of the particles of an emulsion of crude carbolic acid with soap, in an alkaline medium, the charge becomes positive and under the influence of the current the bacteria will travel to the negative pole. They become positive in the presence of the negative colloid and remove the charge from the particles of the emulsion. This removal causes the particles to break up, and the constituents of the emulsion are liberated around the bacteria in a concentration out of proportion to the degree of dilution."—*Tropical Diseases Bulletin*, June 15, 1915.

*

New Move on Alcohol.—"The strategy of the New York City Health Department's campaign against drink has been placed in the hands of an advisory committee of citizens representing a wide variety of scientific, educational and social organizations, most of which have not been identified with the temperance movement," says *The Survey* of July 3, 1915.

"Among the organizations represented are the New York State Commission for the Blind, American Association for Labor Legislation, Association for Improving the Condition of the Poor, Hudson Guild, State Charities Aid Association, Brooklyn Bureau of Charities, New York Social Center Committee, Jewish Community, Committee of Safety, Russell Sage Foundation and the Boy Scouts of America.

"Public officials include representatives of the Departments of Public Charities, Education, Police, Mayor's Employees' Committee and the State Department of Labor. Educational institutions are Columbia University, Cornell University, College of the City of New York and Hunters College. Labor is represented by the Central Federated Union, and there are representatives of the Life Extension Institute, the Metropolitan Life Insurance Company, United States Brewers Association, the army-post at Governor's Island, the Press Club and various trade groups as, the New York Wholesale Grocers' Association, the editor of the *American Druggist* and a group of leading medical men."

As reasons for the new activity of the New York Health Department, the following quotation from the *Weekly Bulletin* for June 19, 1915 is cited:

"At a recent conference attended by 200 Indiana health officers, a resolution was adopted unanimously declaring that health officers and physicians should join in the campaign against alcohol. As a matter of fact, health officials in many states are already engaged in efforts to combat intemperance by educational means, and ample justification for their activities in this field is to be found in the following facts:

"A diminution in the consumption of alcohol by the community, according to those who are in a position to know and to judge, would mean less tuberculosis, less poverty, less dependency, and less pressure on our hospitals, asylums and jails. Intemperate drinking cuts into the support of the family. The drinking of parents weakens the vitality of children. Drinking mothers lose twice as many babies as do sober mothers. More alcoholism is found in the parents of feeble-minded children than in the parents of normal children. The children of drinkers develop more slowly and do poorer school work than do the children of abstainers. Alcohol impairs the tone of the muscles, lessens the product of laborers, depreciates the skill and endurance of artisans, impairs memory, multiplies industrial accidents, causes chronic disease of the heart, liver, stomach and kidneys, in-

creases the death-rate from pneumonia, and lessens natural immunity to infectious diseases."

*

Diphtheria Carriers.—The following excerpt from the California State Board of Health *Monthly Bulletin* for May is of very practical public health interest:

"The control of the chronic diphtheria carrier is a more serious problem than his discovery. Health officers of California can save themselves much trouble by following strictly the regulations of the California State Board of Health for the prevention and control of diphtheria (Special Bulletin No. 6). In the regulations a distinction is made between the acute case of diphtheria and the chronic carrier. It is neither practicable nor desirable to keep all diphtheria carriers under complete quarantine for an indefinite period of time. It is usually not necessary to quarantine the entire premises of a chronic diphtheria carrier, if the health officer will make a plan, to suit the conditions, whereby the carrier can have a limited freedom without endangering others. This plan should be submitted to the State Board of Health for approval. Rulings regarding carriers must of necessity be adapted to the special case. Often a carrier living in a farmhouse can safely be given almost complete freedom, while one in a crowded tenement will sometimes need rigid quarantine. Through the composite of the many experiences of health officers there will gradually be evolved more efficient methods for controlling carriers.

"The experience of Dr. W. E. Coppedge, health officer of Alturas, illustrates the manner in which the number of diphtheria carriers is greatly increased in the presence of a few cases of diphtheria, and how some of our local health officials are doing constructive and successful work in controlling this disease. Recently a very few cases of diphtheria appeared among the school children in Alturas, and Doctor Coppedge at once saw the danger and took steps to exclude all carriers from school. Cultures were taken from the school children and sent to the State Hygienic Laboratory. It was found that 16 per cent. of all the children had become carriers. In the classroom of one of two boys who were supposed to have brought the disease into the school, 28 per cent. of the children were carriers.

"The exclusion of all these carriers, together with the absence of children who were kept at home by their parents, seriously diminished school attendance. The loss of instruction to the children who were excluded and the threatened loss of a teacher owing to the reduction in attendance led Doctor Coppedge to plan a separate school for the carriers where they could get instruction under adequate supervision until their throats and noses became free from diphtheria bacilli. This plan was approved by the State Board of Health, but was given up owing to the opposition of people living near the proposed school for carriers. Fortunately all of the carriers soon cleared up and were able to go back to school."

*

The Care of the Baby.—In the June issue of *Public Health* published by the Michigan State Board of Health, there is a very interesting article on "The Care of the Baby," The author of this article sets forth nineteen things which he calls "Foes of the Baby." Then follow fourteen topics under the title "The Baby's Friends." The lists follow:

Foes of the Baby.

1. Habits of mother.
2. Bad housing conditions.
3. Impure air.
4. Unwholesome milk.
5. Impure water.
6. Mothers who dope their young.
7. Law-makers who oppose measures for the safe-guarding of human life, especially that of children.
8. Parsimonious taxpayers who place the hoarding of money above measures for the protection of the lives of children.
9. Dirty milkmen and milkmen who put preservatives in milk, or those who sell milk from tuberculous cows.
10. Flies and mosquitoes.
11. Dust.
12. Over-exposure to heat.
13. Mothers and fathers who expose their children to contagious diseases on the absurd supposition that a child must have such disease.
14. Violation of quarantine.
15. People with venereal diseases.
16. People who sell and drink intoxicating liquors.
17. Dirty parents with the natural sequence of dirty homes.

18. Poverty.

19. Women of the rich who care more for a dinner party or some other social function than they do to nurse and mother their children.

The Baby's Friends.

1. Mothers who are not too proud to suckle their young.

2. Health officers, both state and local.

3. The United States government through the medium of the Public Health Service, and its health publications in the agricultural department, but more especially by its children's bureau.

4. The visiting nurses who visit pregnant mothers and instruct them as to the proper care of themselves and their offspring.

5. Little Mother classes, and Little Mother leagues.

6. Mothers' classes as a part of child welfare work.

7. The attention directed to babies by the grange, mothers' clubs, women's clubs and various other civic and benevolent agencies.

8. Newspapers which use their columns to promote good sanitation and healthy conditions of living.

9. The people who lead the war upon flies and mosquitoes.

10. Cities that take care of their garbage and sewage properly and safeguard their water supply.

11. Milk stations and baby clinics.

12. Pregnancy clinics and floating hospitals.

13. Distribution of literature such as department bulletin and pamphlets and

14. Mothers' pensions.

*

Model Law for Morbidity Reports.—The Public Health Reports of the United States Public Health Service for July 2, contains a draft of a "model law" to provide for the notification of the occurrence and prevalence of certain diseases. The diseases which it is proposed to make reportable are classified in three groups, communicable diseases, occupational diseases and injuries, and miscellaneous. Under this latter group are included the following five titles: Beriberi, cancer, continued fever lasting seven days, drug addictions or habits, and pellagra. It is made incumbent upon physicians, midwives, householders and schoolteachers to report cases of disease or presumable disease to the proper authorities. The proposed law would seem on brief examination to be an excellent one, but it is probably not a great improvement on the present laws of some of the states which are most advanced in public health matters.

*

More War on Typhoid.—"A movement is now on foot," states a recent press article of the North Carolina Board of Health, "to have all federal employees vaccinated against typhoid fever. This will be an army of 400,000 men and women. Secretary of the Treasury, W. G. McAdoo, has designated 164 stations in the United States where any federal employee may be given the treatment free of all cost.

"Reckoning the period of immunity for four years and basing the calculation upon what has already been accomplished, the secretary sees where the compliance with this offer will save 300 lives and at least 3,000 people from periods of invalidism. The records show that six federal employees die each month from typhoid fever. There are seventy new vacancies to be filled every year due to this one disease alone. As most cases follow the vacation season, special emphasis is given the importance of being vaccinated before the vacation season begins.

"So valuable has the use of anti-typhoid vaccine proven, not only as a life-saver but as a time-saver as well, that federal authorities and big corporations, particularly our cotton mills and large manufacturing establishments, are now considering it a wise investment to have all their employees inoculated against typhoid. One of the first things the Panama-Pacific International Exposition authorities did was to have all employees on the grounds inoculated against typhoid early in the year. This was done by March 31, and the wisdom of this precaution is now being felt."

*

Utilizing Police for Health Work.—Following a notice to the effect that the Department of Police and the Department of Health in Chicago will coöperate in the future—a recent issue of the *Bulletin* details the plan to be carried out.

"The policeman who travels his beat is the one city official that is in constant daily touch with the people of the community in which he works. Necessarily, too, he is or should be better informed as to the physical conditions of the

neighborhoods that he covers in his daily rounds, than any other city employee.

"Because this is true and because it is putting into practical effect the idea of closer coöperation between the different branches of the city service, the commissioner of health, the superintendent of police and the superintendent of streets are now formulating a plan by which the entire police force of the city will work in a constructive and coöperative way with the Department of Health in the great work of community sanitation. In other words, it is planned that police officers, in addition to looking after violations of the criminal code of the city, shall also give to the Department of Health the benefit of their observations as to physical conditions in the various communities that they serve throughout the city.

"The Department of Health has never been able to do, except in a very limited way, what is known as volunteer or pickup work. Nearly all of the time of the inspectors is taken up in investigating complaints, so that little time is left for anything like a thorough canvass of any given locality for the investigation of general sanitary conditions.

"It has been worked out that the police will be able to report to the Department of Health such violations of the sanitary ordinances as come under their observation without imposing any very heavy additional duties. Also that in very many instances, perhaps practically all violations of a minor character, the police will be able to secure corrections and abatements without the Department of Health being compelled to resort to the slow process of serving notices and following these up with suits in the courts. It is believed with the growing spirit of coöperation on the part of the people themselves, that when police officers call the attention of citizens to violations, for example, such as fly-breeding manure piles, dirty premises, improper care of garbage and refuse, etc., prompt compliance will be given on the part of the citizen to such notices."

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Vermont's New Law.—On March 25, 1915, the Vermont legislature enacted the following—one of the most drastic efforts in the country—for the solution of the venereal disease problem:

"A person who, knowing himself to be infected with gonorrhea or syphilis, marries, shall be fined not more than $500 or imprisoned in the house of correction for not more than two years.

"A person who, while infected with gonorrhea or syphilis, has sexual intercourse, shall be fined not more than $500 or imprisoned in the house of correction for not more than one year.

"A physician who knows or has reason to believe that a person whom he treats or prescribes for is infected with either gonorrhea or syphilis, shall immediately report the name, address, age, and sex of such person to the secretary of the State Board of Health, for which report he shall receive the sum of 25 cents, to be paid by the State Board of Health. A physician who fails to make such report shall be fined not more than $200.

"The State Board of Health shall make and enforce such rules and regulations for the quarantining and treatment of cases of gonorrhea and syphilis reported to it as may be deemed necessary for the protection of the public. Said board shall not disclose the names or addresses of persons reported or treated to any person other than a prosecuting officer or in court on prosecution under this act.

"The sum of $1,000 is annually appropriated for carrying out the provisions of this act."

✻

Health Workers Must Take Their Own Medicine.—Mr. Health Officer, are you like "Pat"—who is referred to in the North Carolina Health Department Bulletin quoted herewith, or are you applying your knowledge of *personal* hygiene to your own life *every day?*

"Practice what you preach" is another one of those homely bits of advice that we are always running up against. This particular one is handed out to public health workers almost as frequently as it is to preachers themselves, and not without grounds, we'll have to admit. For instance, the other day, "Pat," the famous anti-typhoid cartoonist whose clever work has been attracting attention through numerous papers of the state and whose advice through his cartoons has been inducing scores of people to take the anti-typhoid treatment as a preventive of typhoid fever, wrote to the State Board of Health, this:

"I have been knocked out for the past week and am still indisposed. Doc says 'fever'; probably so. It's antitoxin for me soon as I get able. Really had planned to start taking it just when I got knocked out."

We ourselves could hardly forego the pleasure of advising him to first practice what he preached but we thought he was learning the lesson well enough first hand.

Another instance in which the same advice was recently sent straight home was in the case of one of the doctors at one of the anti-typhoid dispensaries. A young fellow who wanted to be sure he was making no mistake in taking the vaccine treatment questioned carefully one after another of those assisting and administering the vaccine as to whether or not they had taken it. Finally, the young fellow came to the doctor who was giving the injections and when he so sternly put the question up to him, the doctor, who we regret had never taken the treatment, was nonplussed. Now Nature had dealt very sparingly with this particular doctor in the matter of superfluous flesh and by reason of hot weather and overwork he became still more emaciated. To sidestep the question, he wriggled out only by saying that he had so little flesh on his bones that he doubted if there could be found a spot big enough in which to make the injection and that it would not do to put it in the bone. The boy looked the doctor over and sympathetically walked away. Whether he thought the doctor was so devoid of flesh as not to be worth saving from typhoid, we never learned. Not long after, however, the doctor, too, took the hint and followed his own advice.

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Worth Watching.—"When the Rockefeller Sanitary Commission," quotes the *Social Service Review* for June, 1915, "concluded its five years of work in the South last winter, the International Health Commission was organized to carry on sanitary investigation in America and abroad. After careful study of conditions the Commission decided to begin intensive campaigns in various states, the object of which should be to illustrate by the eradication of certain communicable diseases the economic importance of public health work.

"At the invitation of the State Board of Health, the International Commission agreed to start such a campaign in Virginia under the direction of the board, and to supply the greater part of the funds necessary. Work was accordingly begun in a district of Southampton County, where a trained health officer and two assistants have been engaged in a canvass of the community, farm by farm, in order to encourage the installation of sanitary devices and to rid it of filth-borne diseases. This work has succeeded so well that the Commission has now agreed to organize through a 'unit' in a selected Virginia community. The salary and expenses of the health officer in charge and the salaries of necessary assistants are paid with funds from the Commission, the incidental expenses are borne by the state, the community is only asked to pay the traveling expenses and the board of the assistants, a total of about $250 for a complete campaign.

"The problem now before the board is to select that progressive Virginia community which is most anxious for a general campaign of sanitary improvement, and will make its contribution to that end. In return the board can practically give assurance that with public coöperation, hookworm disease can be made to disappear, fly-borne typhoid can be eradicated, infants' complaints can be decreased, and the general health of the community can be greatly improved."

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"Good Water for Farm Homes."—Public Health Bulletin No. 70 with the above title made its appearance in May and is a pamphlet which all county health officers, at least, should advertise and distribute. The author, A. W. Freeman, epidemiologist of the United States Public Health Service, has compiled a brief sixteen-page, admirably illustrated bulletin, thoroughly unburdened of all technical language and treatment.

In the same connection, a reprint from the Yearbook of the Department of Agriculture for 1914 ought to be mentioned. The article entitled, "Clean Water and How to Get It on the Farm," by R. W. Trullinger, is a most able and useful treatment of the subject. The questions of practicability, convenience and cost are always considered, but never to the neglect of that of health.

*

The Question of Clean Milk.—The following opinion of H. E. Barnard, State Food and Drug Commissioner of Indiana, expressed at the last annual convention of the International Association of Dairy and Milk Inspectors, is worthy of thought:

"Am I overstating when I say that there has

been a feeling on the part of the producer that the public will not pay a better price for a clean milk than it will pay for dirty and unwholesome milk? This has no doubt been true. The price of flour has varied with its breadmaking qualities; the cost of meat depended on the cut; the character of fruit fixes its market value; but the price of milk is arbitrarily set by custom and is dependent on no standard of composition, excellency or purity. Milk is milk, and whether it is produced in accordance with the best principles of dairy practice or drawn from poorly nourished, diseased cows, stabled in filthy barns, the customer has cared little so long as he gets cream for his coffee and a white fluid for his children. This lack of concern on the part of the consumer has made it possible for the dairyman with slovenly habits and a poor equipment to compete with the man who is trying to produce a high grade milk, and as a result the price of milk has been fixed close to the cost of production under the most unsanitary conditions.

"We can hardly hold the municipalities responsible for the consumer's lack of appreciation of the fact that clean milk is worth what it costs. But until milk is bought on that basis the efforts of the milk inspector must be largely punitive. The health authorities can only control the milk supply by denying the dirty dairy a market and by punishing the man who sells dirty milk. The experience of a thousand cities finds little real progress in such methods of control. Each year I am becoming the more convinced that the ultimate settlement of the question must come from within rather than from without, that is, that the problem of a pure milk supply rests with the dairyman rather than with the inspector. Like morality, clean milk will come not as a result of legislation, or of state or municipal control, but of education."

Babies vs. Flies and Dirt.—From a careful analysis of a three months' study, the object of which was to determine the real relationship of flies and filth in their separate and combined influence on infant mortality—the New York City Health Department feels justified in the following conclusions—as outlined in the *Weekly Bulletin* of June 19, 1915:

Fly Factor.—Almost twice (1.9) as many infants were attacked by diarrhea among fly-exposed as among the fly-protected infants.

Dirt Factor.—The group of influences other than flies and artificial feeding, associated with a dirty home and designated as the "dirt" factor, play a similar part in diarrheal incidence among infants. Almost twice (1.8) as many infants were attacked by diarrhea in dirty homes as in the clean homes.

Artificial Feeding Factor.—Of somewhat greater importane is the influence of artificial feeding. Almost two and a half (2.4) times as many infants were attacked by diarrhea among the artificially fed as among the breast-fed infants.

Flies and Dirt Factor.—The influence of flies and dirt combined is of similar importance to that of artificial feeding. Almost two and a half (2.4) times as many fly-exposed infants in dirty homes were attacked by diarrhea as fly-protected infants in clean homes.

Dirt and Artificial Feeding Factor.—The influence of dirt and artificial feeding combined is still greater. Three and a half (3.5) times as many artificially fed infants in dirty homes were attacked by diarrhea as breast-fed infants in clean homes. (In this case, however, the influence of fly exposure is not eliminated.)

The above is important in as much as it is the first really reliable information worked out from so large a number of observations.

Public Health Notes.

The County as the Unit in the Tuberculosis Campaign.—George J. Nelbach of the New York State Charities Aid Association says that the tuberculosis problem is one largely for local authority and that the county as a political unit has great responsibility in the antituberculosis movement. On account of the immensity of the problem and the great expense connected with it the county is the most practical unit to deal with it, and as already provided for in some states, the county should not only establish an institution for the care and treatment of tuberculosis, but such hospitals should be the center of the organized movement against the disease in the community. It should assume complete responsibility for the discovery and diagnosis of cases and for their care, for the friendly oversight of discharged cases, for the sanitary and medical supervision of patients in their homes, and for a continuous campaign of health education.—*Journal American Medical Association*, July 24, 1915.

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The Public Health Profession.—In an article appearing in the *Journal of the American Medical Association*, July 24, 1915, Prof. M. J. Rosenau of Harvard calls attention to the fact that in only three medical schools, University of Pennsylvania, University of Michigan, and Harvard, is hygiene included in the curriculum as a major subject. The author notes that the training received for the M. D. degree does not qualify a man to enter public health work. Indeed he states that, "Sanitation and hygiene has become a separate profession." The article proceeds to discuss the value of a sanitary survey in the teaching of hygiene.

The employment of a full-time health officer in the small city or village is not a common thing throughout the United States and the fact that this is generally known is probably the principal reason why the number now preparing for the "separate profession" of which Professor Rosenau speaks is so small.

When a new field of work—especially one requiring expert training—is just opening up, the supply of workers will generally be forthcoming only after it is clear that there is a continuing demand and that the remuneration is substantial.

The specific is the one which must be indicated in most of the pathological conditions in the body politic—*education*. Education of the public concerning community health needs will create the demand for men trained in the separate profession of hygiene and sanitation, then many institutions will be quick to institute courses of this sort.

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The Use of Words.—The subject of the Chairman's address before the Section on Practice of Medicine at the late meeting of the American Medical Association at San Francisco, by Dr. Thomas McCrae, Philadelphia (*Journal A. M. A.*, July 10, 1915), was the use and abuse of words. He called attention to the many disputes which have arisen where the use of words was involved, and held that we should use a rigid standard, especially in medical matters. Many people have their own peculiar conceptions of terms, and words are given attributes they do not possess. For example, the word pneumonia involves quite a variety of conceptions in the minds of different persons. In a meeting of medical teachers ten years ago the terminology of the diseases of the chest was discussed and the varied meanings attached to the same term brought out in the discussion surprised everyone. Much difference of opinion will be found in the use of the words bronchial and tubular, and students have been graduated for years with erroneous ideas as to the meaning of a certain term. Many illustrations are given by McCrae as to the misuse of the names of diseases and symptoms. He says if one wishes to find confusion worse confounded let him read an article in French or German dealing with arthritis. What the term rheumatism means in many of these no one but the author can tell. The use of the word rheumatism leads to careless diagnosis, and the list of diseases and conditions which have been classed under this head is a long one. The word phthisis is another misused term, as well as Bright's disease, asthma, bilious and biliousness, typhoid, hysteria, etc. (all of

which have numerous meanings), and many others which need to have some attention as to clearness in regard to their use. For those who are teachers the duty of accuracy in the use of words is important. How can definite ideas be conveyed by indefinite terms? For proper therapy it is equally important to have clear ideas. Treatment directed to a name is not likely to help the patient. When so much depends on the choice of terms is it not worth while to use them with care and precision?

*

Midwives and Blindness.—A recent bulletin of the New York Committee For the Prevention of Blindness contains this note with regard to midwives:

Midwives.

These women attend about half the births occurring in this country, and the majority of them are dirty, ignorant and generally unfit to assume the care of mothers and babies. Although the carelessness of many physicians is equally reprehensible, it is due in great measure to the ignorance and neglect on the part of midwives that many babies become blind from babies' sore eyes.

1. Are there midwives practising in your community?

2. Are they registered by an official body?

3. Is it required that they be adequately trained; pass an examination; obtain a license; and register before beginning to practise?

4. Has your community a midwife training school connected with a good hospital?

5. Do the practising midwives give clean, careful nursing care to mother and child, and instruction to the mother concerning hygiene of pregnancy and care of her child?

6. Has the state or city health department adopted rules regulating midwives' practise in detail and requiring them to summon a physician in all but normal cases?

7. Are there inspectors to enforce the rules and give helpful advice to the midwives?"

The committee is endeavoring to secure the widest possible circulation for its bulletins, which are excellently prepared and should be of great value in educating the public on the matter of unnecessary blindness.

Bibliography on Garbage and Refuse Disposal.—*Municipal Engineering* for July, in its Question Department, gives the following useful bibliography in answer to a question concerning garbage and refuse disposal methods:

Information about the higher-temperature destructors can be obtained from such firms as The Destructor Co., 111 Broadway, New York; J. B. Harris, 65 Life and Casualty Bldg., Nashville, Tenn.; Atkinson-Morse Destructor Co., 30 Church Street, New York; Morse-Boulger Destructor Co., New York. Information about lower-temperature incinerators may be obtained of the Decarie Co., Minneapolis, Minn.; The Dixon Engineering Co., Toledo, O., and others. Information about reduction plants is available mainly from the municipal plants at Cleveland and Columbus, O., and will be later from the new plant at Akron, O.

There are a number of recent projects for disposing of garbage by chemical treatment, by maceration, by pulverizing, followed if necessary by drying, producing fertilizers or base for fertilizers. Some of these have been described in *Municipal Engineering*. Some recent articles are given in the following list:

In Vol. xlviii: Garbage Reduced to Fertilizer, p. 299; Making Fuel Out of Garbage, 304; Garbage and Refuse Collection and Disposal in St. Louis, Mo., 340; Disposal of Garbage and Refuse in Seattle, p. 118; Garbage Disposal for North Yakima.

In Vol. xlvii: Street Cleaning and Refuse Disposal in Philadelphia, p. 19; Profitable Conversion of City Garbage, p. 25; Vancouver Garbage Collection and Disposal Ordinance and Methods, p. 41; The Harris Municipal Garbage Incinerator and Steam Generator, p. 72; Garbage Incinerators and Destructors, p. 114; Garbage Disposal by the Hirsh Chemical System, p. 131; Refuse Destructor at Clifton, Boro of Richmond, New York City, p. 207; Garbage Reduction Systems, p. 291; Plants Making Fertilizer from Garbage, p. 292; Methods of Collection and Disposal of Garbage, p. 292; Domestic Refuse Destructor, p. 413; Refuse Destructor at Savannah, Ga., p. 416.

Two or three of these articles give references to previous articles and classified lists of the same, including one on Mixed Method Garbage and Waste Disposal in Vol. xlv, p. 25.

All the articles named above are descriptions of modern practice or of new method of more or less value which have been tested or are seriously proposed for test.

Morse's "Collection and Disposal of Municipal Waste" ($5) was at the time of its publication, 1908, the most complete record of operations in the United States covered by its title. Parson's "Disposal of Municipal Refuse" ($2) is a statement of New York practice. Venable's "Garbage Crematories in America" ($2) gives a full list of patents and descriptions of the plants using them up to 1906. Goodrich's three or more books give English destructor practice with brief mentions of American work of similiar nature.

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Infections of the Tonsils.—The following is a summary of an article by F. C. Pybus in the *Lancet* of May 22:

"In the course of an extensive discussion of the various infections of the tonsils, Pybus cites statistics which show that 10 per cent. of all school children in London were found to have tonsils sufficiently enlarged to demand surgical treatment. There is also a close relation existing between the number of carious teeth in children and the presence of enlargement of the tonsils. Thus, only 42 per cent. of children free from carious teeth showed any enlargement of the tonsils, while this was present in 67 per cent. of children with five or more carious teeth. Again, in children twelve years old nearly 23 per cent. more with enlarged tonsils had carious teeth than among those free from tonsillar enlargement. It has also been shown that tonsillar hypertrophy is materially reduced by the institution of proper oral hygiene. Enlarged tonsils may project beyond the pillars of the fauces to such an extent as to make their recognition certain and easy, but they may be equally enlarged and still not project. It should be a matter of routine when examining children, therefore, to make them gag in order to bring forward imbedded, enlarged tonsils. Some estimate of the degree of septic infection of the tonsils should be made in every case in which they are enlarged. This is best accomplished by examining the lacunæ with the aid of a bent probe. A series of tonsils which had been removed for hypertrophy were examined and 60 per cent. of them were found to be grossly infected."—*New York Medical Journal*, June 12.

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Another Summer Course for Health Officers. During the last part of July and first part of August a summer normal course for city and county health officers and others interested, was conducted at the University of Texas. The program consisted of lectures on municipal health, organization and administration of public health, public health laws, vital statistics, anti-narcotic law, human carriers of disease, epidemiology, purification of water supplies, plumbing and sewers, septic tanks, vaccination, rabies and its treatment, infant feeding, baby welfare, sex hygiene, laboratory diagnosis, medical supervision in public schools, serums and bacterines, rural homes, school hygiene and sanitation, rural health problems and pure foods.

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Tetanus Carriers.—"From observations made in the laboratories of the Sheffield Scientific School of Yale University, Noble," says *The Journal of the American Medical Association*, for May 29, 1915, "has reached the conclusion that the tetanus bacillus appears in the intestines of many normal animals, especially of the herbivora. Apparently it is impossible, with the current technic available, to detect the microorganism unless it is present in relatively large numbers. Park states that 15 per cent. of horses and calves in the vicinity of New York City harbor tetanus bacilli in their intestines. Noble found that eleven out of sixty-one horses examined, or 18 per cent., showed this organism in their feces. He failed to find them in the excreta of cows; but the investigations on this species were not conclusive, because they were made on a herd of cattle confined in a barn during the winter months when the diet of ensilage was such as to exclude the probability of its containing tetanus spores.

"Noble is inclined to the belief that the tetanus bacillus may multiply within the intestines of suitable animals. Some of these seem to offer especially favorable conditions for this growth. Tests on two selected horses showed that the tetanus spores disappeared from the feces of one fourteen days after the beginning of the observations; whereas the other animal harbored them

continuously for four months, although, here too, they eventually disappeared. It is highly improbable that this persistence was due to repeated reinfection, because other horses in the same stable showed no signs of fresh invasion by the tetanus bacilli.

"If these observations are valid in demonstrating that individual horses may harbor tetanus bacilli in their alimentary tract for many months following an initial infection, the phenomenon would appear to present the case of a 'tetanus carrier' comparable with the well-known typhoid carriers and other seemingly healthy disseminators of human infection. How common the 'tetanus carriers' may be among horses remains to be ascertained; but, as Noble contends, if we grant their existence, the universal distribution of tetanus spores is not difficult to explain. In any event, the presence of these forms in soils, street dirt, fresh vegetables, on the clothing and the skin is easily attributable to fecal contamination, as has so often been maintained."

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Physicians and Public Health.—An excellent article by John W. Trask, Assistant Surgeon General, entitled "The Practicing Physician, His Relation to Public Health Administration," appears in the *Public Health Report* for June 11, 1915. He traces the development of public health. He names the purpose of the health department as the control of "disease in the community" and goes on as follows:

"Now, inasmuch as the health department cannot do its work without information of the occurrence of cases of the controllable diseases and inasmuch as this information can be had only through the reports made by physicians of the occurrence of cases in their practice, the physician becomes an essential part of any scheme of public health administration. The practicing physician is essentially a part of the health department. This is true, whether the physician recognizes it or not, and whether the community recognizes it or not. The physician is the outpost, the picket that must give to the health department information of the approach of the enemy, his numerical strength, and his armament.

"Coöperating with an efficient health officer the practicing physicians of a community have it within their power to make the efforts of the health department successful or to make their success impossible. So important is the control of disease to the welfare of the community, and so essential is the coöperation of the practicing physician through the reporting of cases, that it may be taken for granted that intelligent communities will bring about a satisfactory coöperation in this work between the physicians and the health department. It is only a question whether a public spirited, humanitarian medical profession will take the initiative and voluntarily and cheerfully accept and carry out its responsibilities, as it undoubtedly will. Any other course is inconceivable. Certainly upon the attitude of the medical profession in this matter will largely depend its relations to the community in the future."

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Interstate Migration of Tuberculous Persons.—It seems to be the general opinion of those who have studied the subject, that care without climate is a far better cure for tuberculosis than climate without care, this being the chief point raised in a series of articles which has appeared in the United States Public Health Reports under the title of "Interstate Migration of Tuberculous Persons."* These articles are the reports of investigations undertaken during the years 1913 and 1914, and cover various sections of the country. A. D. Foster undertook the work in North and South Carolina, P. M. Carrington in California, E. A. Sweet in Texas and New Mexico, and A. J. Lanza in Arizona and Colorado. Their object was to determine:

1. The extent and direction of such migration;

2. The effects of travel on tuberculous persons themselves;

3. The bearing of the migration of tuberculous persons on the health of other travelers and on employees of common carriers;

4. The condition under which tuberculous persons live in localities resorted to for change of climate and the effects of these conditions on the progress of their disease.

5. The bearing of the presence of tuberculous persons on the health and on the social and eco-

* United States Public Health Reports, Mar. 12, 1915; Mar. 19, 1915; Apr. 9, 1915; Apr. 16, 1915; Apr. 23, 1915; June 18, 1915.

nomic status of communities to which they have migrated in search of health.

6. The degree of forced migration of indigent tuberculous persons from communities hostile to their presence.

Tuberculous travelers naturally fall into two large groups—those who are well-to-do, and those who are not. The former are, in this discussion, a negligible factor; they travel most comfortably, are constantly under adequate medical supervision, have no financial troubles, and may thus devote their entire attention to getting well. They are welcomed everywhere for it is due to just this class of persons that a great many communities in the West and Southwest have been built up.

Those of the second class, who form, unfortunately, the vast majority of those in search of health, present a far more complicated problem. The prevalent idea among them is that one has merely to go to the resort town most highly recommended and that the climate will do the rest. They do not realize that the only way to use climate is to be out in it, every day all day, and every night all night. Some arrive at their destinations with very little money and expect to find employment, not thinking, or perhaps not knowing that, should they be successful in this attempt, they will thereby lose that most necessary of all things—complete rest. There are others whose implicit faith in the curative powers of climate leads them to think that they can do without many of the comforts to which they have been accustomed at home and go without even sufficient nourishing food, thereby cutting off another avenue to recovery. Very few of this poorer class know that they should be under constant medical supervision and may let a fever run for months without ever consulting a doctor. Practically all of them worry about their financial difficulties, and many become despondent over the separation from family and friends. For their own sakes, as well as for the sake of the community on which many at length become dependent, it would have been far better had they stayed at home.

The authors are unanimous in their decision that physicians should never recommend a change of climate unless they are sure that the patient can well afford it, and is in such a stage of the disease that the trip itself will have no ill effects upon him. They should rather teach their patients that intelligent attention to hygiene is more important than the climate they happen to live in and that money spent in railroad fare and board away from home would be of infinitely greater benefit if spent on nourishing food at home with the family, or among friends who are really vitally interested in the recovery of the patient. The excellent care given will procure results which will far outweigh the supposed benefits of climatic change.

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A Half Century of Antiseptic Surgery.—"Those who fail to recall the historical development of the modern surgical technic," says *The Journal of the American Medical Association*, in a comment on the semicentenary of the introduction of aseptic surgery, "are sometimes wont to assume that because certain current aseptic procedures have entirely superseded the antiseptic devices introduced by Lister, the advantages of his precautions are no longer essential. It must be remembered, however, that antiseptic and aseptic are nothing other than two ways of arriving at one result. In the words of Sir William Osler: 'It is the difference between tweedledum and tweedledee. They are both applications of the same principle.' We cannot summarize the situation better than by quoting Paget. It is true, he writes, that Lister was more afraid of the powers of the air, half a century ago, than surgeons are now; it is true that his use of a phenol spray, to sterilize the air around the wound, has been given up; but the law of all operations remains today that law which was revealed to him in 1865, in the light of Pasteur's work on putrefaction. From the very first, antiseptic surgery had in itself the making of aseptic surgery.

"The principles defended and applied by Lister find applications in everyday life at the hands of the layman; their value is further attested in the prominence which they play in modern military régime. The soldier on the European battlefields has been taught to apply an antiseptic dressing promptly to the wound he has received in action, and the enlightened teachings of Lister follow him through all the subsequent stages of his treatment to recovery. After a lapse of fifty years we may well pause to recall that Lister was instrumental in saving more lives than the armies of the greatest general or potentate have destroyed. Let us

mark the anniversary on our medical calendar and pay a tribute to the masterful genius of Lister, 'a man serene through controversy, a spirit of invincible patience and of radiant purity.'"

✻

Meningococci in Nasal Cavity of Horses.—The *Riforma Medica*, May 29, 1915, contains an article by L. Mazzetti relating an experience among Italian soldiers.

"Of 2,000 soldiers in camp, 800 were found to be carriers of meningococci. The sole source of contagion would seem to be the nasal mucous membrane whence the germs are disseminated by sneezing, coughing, spitting, even by talking. An attack of coryza greatly increases the number of cocci and therefore enhances the danger of infection. Discovery of the fact that cavalry soldiers were much more frequent carriers than infantry prompted the examination of the nasal cavities of their horses, with the result that a large number were found to be carriers of meningococci. It would seem to be demonstrated that human carriers may infect horses which in turn infect other horses as well as human beings."—*New York Medical Journal.*

✻

Public Health Improvements Following the Disinfection of Water Supplies.—Interesting statistics dealing with the above subject have recently been presented before the New York Section of the American Water-Works Association by F. F. Longley of the firm Hazen, Whipple & Fuller. These statistics were based on more than one hundred replies received from inquiries sent to the water-works throughout the United States and Canada. Eighty per cent. of these water-works use hypochlorite of lime and the rest liquid chlorine. The following statements describe improvements which have resulted at various places:

"In Cleveland, Ohio, the chlorination of the water-supply started in September, 1911. In the six calendar years prior to this the typhoid death-rates had varied from 13.0 to 20.2, with an average of 16.5 per 100,000. In the three calendar years following, the typhoid death-rates were from 6.2 to 13.5, with an average of 9.2 per 100,000.

In Evanston, Ill., disinfection was first applied in December, 1911. The statistics at hand cover the period of four years prior to this, and three years thereafter. The death-rate from typhoid in the former period varied from 24 to 33, averaging 29 per 100,000. In the period since disinfection it has varied from 6 to 15, with an average of 12. The death-rate from gastro-enteritis during the former period varied from 25 to 73, with an average of 49 per 100,000; and in the latter period with disinfection varied from 11 to 40, with an average of 30.

In the city of Baltimore there has been a decided reduction in the typhoid mortality since the use of calci hypochlorite. It was first used in June, 1911. In the five years prior to that the death-rate from typhoid varied from 33 to 42 per 100,000, with an average of 35. In the three years since, it has varied from 22 to 24, with an average of 23.

In Poughkeepsie the disinfection of the supply was first begun in 1908 in the form of hypochlorite applied to the water before sedimentation and filtration. The death-rate from typhoid fever for eight years prior to 1908, as indicated by the United States Census reports, varied from 25 to 114, with an average of 54 per 100,000. From 1908 to 1913, with treatment as stated above, the typhoid death-rate varied from 10.3 to 33, with an average of 18.5. Since early in the year 1914 the filter effluent has also been treated, first by means of hypochlorite, and latterly by means of liquid chlorine, and the death-rate from typhoid fever for that year was 3.4 per 100,000.

Trenton, N. J., is one of the most striking cases of improvement due to disinfection. Prior to 1912 the city used the raw Delaware River water. In December, 1911, the authorities commenced to treat the water-supply with hypochlorite. During the five years ending with 1911 the total annual number of typhoid cases varied from 208 to 343, with an average of 267. During the three years since disinfection has been applied, the number of cases in the city has varied from 45 to 110, with an average of 74.

In Ottawa the water of the Ottawa River was used without treatment until about March, 1912. Its polluted condition was evidenced by the several epidemics of water-borne typhoid that the city had been through just prior to that. Since the disinfection of the supply, Ottawa has had no further epidemics and only a moderate death-rate from typhoid.

The city of Hull, with only about one-twen-

tieth the population of Ottawa, lying on the opposite bank of the river, takes its water-supply, untreated, from the same channel as does Ottawa and within a few hundred yards of it. In two recent months Hull has had about 200 cases of typhoid fever, as against 28 in Ottawa for the same period."—*The American City*, May, 1915.

*

Anti-Tuberculosis Legislation in Missouri.—At the last session of the Missouri legislature, five bills were passed dealing with tuberculosis. Two of the bills deal with the state as a whole; one provides for state-aided county tuberculosis hospitals, the other permits city councils and the county courts to employ visiting nurses for tuberculosis cases. The three other bills, applying to the lead and zinc mine districts, provide for the suppression of dust in the mines, for individual drinking cups and sanitary devices, and for adequate bathing facilities and dressing rooms.—*The Survey*, May 22.

*

Gasoline to Prevent Wound Infection.—The *Presse Medicale*, April 1, contains an article by Doctor Eynard which recommends gasoline for removing the fatty material from the wound and skin surface before the application of tincture of iodine and a septic dressing. The gasoline is not irritating to the wound or to the hands of the attendant and leaves the tissues dry and receptive to the action of iodine. It is less volatile, dangerous and expensive than ether.

*

Protective Substances of Milk of Animals Immunized against Tuberculosis.—The *New York Medical Journal* gives the following summary of an article by L. Sivori:

"Experiments on immunized cows show that antigens and antibodies are found in the milk, though not in such quantities as in the blood. These experiments verified the findings of Figari and Ricci that antitoxic and agglutinating materials from one animal produced specific antibodies in the milk of other animals injected with them. Further, animals born of nonimmunized mothers, fed with the milk of immunized animals showed antitoxins and agglutinins in their serum, thus proving absorption of such bodies from the gastrointestinal canal."—*Riforma Medica.*

Industrial Hygiene and Sanitation.

*

Scaffold Rope Testing.—The *Edison Monthly* for July contains a short article entitled "For Scaffold Safety." This article calls attention to the fact that there has never been a law that required any particular kind of examination or testing of rope and states that hundreds of workmen are injured each year in accidents due to worn and rotten rope. The article proceeds to describe a rope-testing devise by means of which every part of a given rope may be tested for any desired maximum tension.

*

Industrial Accidents.—The Committee for the Prevention of Blindness has issued a circular entitled, "What Women's Clubs and Nursing Organizations Can Do to Prevent Blindness." The following is an extract from it:

"Many good workmen are seriously handicapped and even become public charges as a result of losing one or both eyes in an accident that might have been prevented. Men, women and children often suffer from severe eye-strain because they are not provided with adequate light while at work.

"1. Are workmen in the factories and shops in your locality protected from eye accidents by goggles; guards on emery wheels; screens to catch flying chips; guards on water gauges; etc.?

"2. Are the factories, workshops and workrooms adequately lighted?

"3. Are workmen examined to see that they are not especially liable to accidents because of defective vision?"

The following regarding the effects of wood alcohol is from the same bulletin:

Wood Alcohol.

"Wood alcohol is a poison which may cause blindness or death if swallowed, or if its fumes are inhaled in an inadequately ventilated place.

"1. Have you a law forbidding wood alcohol to be sold in any form without a poison label and warning?

"2. Is the use of wood alcohol absolutely forbidden in beverages, medicines and toilet preparations?

"3. Are your druggists, paint and varnish dealers, liquor dealers, grocers and barbers prosecuted for failure to comply with the above restrictions?

"4. Is wood alcohol used in any of your local industries? If so, are employers required to protect their workmen from poisoning by providing adequate ventilation?

"Your Board of Pharmacy, Department of Labor, Health Department and Commissioner of Excise have jurisdiction in this matter. Find out what they are doing about it. In the meantime, urge your druggists to give up the sale of wood alcohol, and urge your friends to use denatured alcohol instead. It is safer and cheaper than wood alcohol."

✻

Call for Volunteers.—Occupational diseases are to be systematically studied clinically, if the plan of the New York City Health Department works out.

"Close students of the trend of medicine will undoubtedly have observed that the diagnosis of occupational diseases will, in a short time, assume a most important rôle in preventive medicine. Manufacturers and working men alike are beginning to manifest no small interest in this phase of industrial hygiene.

"An unusual opportunity to do research work in the study of occupational diseases is now offered in the Occupational Clinic of the Department of Health recently established at No. 49 Lafayette Street. This clinic, though not yet fully equipped, already possesses the most important accessories for scientific clinical work.

"It is desired to secure the assistance of competent clinical workers in this field. A list of volunteers will therefore be established, from which to draw medical assistants for work in the clinic. In the Budget for 1916, request will be made for the establishment of a number of positions for clinic physicians at $300 per annum. The hours of work will be from ten a. m. to twelve or twelve-thirty p. m., three days a week. Those to whom this opportunity makes an appeal should make application in writing to the director of the Bureau of Preventable Diseases, Department of Health, New York City, stating their clinical experience."—*Weekly Bulletin*, June 12, 1915.

✻

First Aid Kits for Factories.—In order to meet the demand for a proper kit to be placed in industrial establishments and factories for first aid services to the injured, Dr. George M. Price has recently devised an apparatus of special value to the garment trades. The container consists of a white enamel metal box in which are placed four glass jars with aluminum covers containing the various bandages, dressings, instruments, and medicines. Explicit instructions are printed on the front drop of the box. The container is dust proof, portable, convenient and inexpensive. A detailed description follows:

"Jar No. 1 contains six half-ounce packages of cotton, individually wrapped and sealed. Jar No. 2 contains twelve sterilized and sealed packages of gauze and one half pound of assorted bandages. Jar No. 3 contains a roll of adhesive plaster, 3 per cent. sodium bicarbonate, petroleum ointment for burns, six drinking cups, safety pins, wooden applicators in a test tube, and a simple tourniquet consisting of a strip of cotton bandage one yard long. Jar No. 4 contains two ounces each of tincture of iodine (half strength), aromatic spirits of ammonia, and boric acid; a pair of scissors; artery clamps to be used as forceps for drawing out splinters or broken off needles; and an aluminum spoon. The cost of this simple first aid medical kit is $4.25."

In order that some one in every department may understand how to use the kit those industries which do not employ a factory nurse arrange for a monthly visit of a nurse who shall instruct various people in methods of treating accidents.—*New York Medical Journal*, June 26.

✻

Burns.—"Burns," says a recent issue of the Ford Motor Company's Publication "For You," "are one of the most common injuries received by factory employees. They are very painful, slow in healing and often result in lifelong disability or severe disfigurement.

"Fortunately burns at the time of accident are free from infection and, if kept clean, will

not result in blood poisoning. The best thing to do when you receive a burn is to leave it alone. *Don't touch it or put anything on it.* Go at once to the Medical Department where proper antiseptics and soothing remedies will be applied.

"The aftertreatment of burns consists mainly in keeping the injury clean and free from infection. Do not touch the dressings put on by the doctor, but present yourself regularly for treatment. *Come to the hospital.*"

✻

Protection Against Lead Poisoning in Printing Establishments.—The *Typographical Journal* for July contains an interesting note regarding the sanitary improvements being installed in the plants of the newspapers of Washington, D. C. Especial reference is made to the piping of typesetting and typecasting machines. The coöperation of the city health officer in bringing about this excellent improvement is mentioned.

✻

Investigation as a Basis of Hygiene Legislation For the Protection of the Worker.—Hemenway, in his recent work on "Public Health—Legal Principles and Administration," speaks of the necessity of basing legislation, directed toward the correction of sanitary and hygienic problems in industry, upon careful investigations. Enthusiastic reformers are too prone to urge legislation upon their own *ipse dixit* that the laws asked for will protect the health of the worker. Doctor Hemenway states that legislation fixing a maximum number of hours of work should be based upon careful studies relative to fatigue. He says: "In considering the hours during which persons may be engaged in any kind of labor, fatigue is a most important element. In this investigation of fatigue, one must discriminate between workers of different age and sex. A man may endure much longer confinement of labor than could a growing youth; and while a woman's constitution may enable her with less fatigue than a man, to do certain kinds of fine mechanical operation, she would be less able to stand many hours of heavy toil."

The necessity for careful study of conditions is even more necessary where the regulations are more specific and are intended for the prevention of occupational diseases.

Industrial hygiene workers, when they are interested in securing legislation, must remember that fundamentally a man has a constitutional right to use his body as he pleases and that restrictions upon this right are dependent upon the police power of the state governments, which is paramount only when circumstances which affect the health morals and safety or the fundamental welfare of the public are involved. It is, hence, of greatest importance that the arguments for such legislation as mentioned should be backed by the findings of a careful statistical investigation. Doctor Hemenway refers to an interesting case in support of his statements. In this case the Illinois court held a certain act to prohibit the use of emery wheels or emery belts in any basement room lying wholly or partly beneath the ground, invalid, as making an arbitrary discrimination without regard to the question of ventilation or other sanitary conditions.

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RECENT PUBLIC HEALTH WORK IN THE UNITED STATES ESPECIALLY IN RELATION TO INFANT MORTALITY.

Joseph S. Neff, M. D., LL. D., D. P. H.

THE great deterrents to progress of public health work in this country have been political influence or control over public health officials; and ignorance of the people, and therefore the government, in the economic value of life and health. This becomes apparent in the study of public hygiene, and is shown conclusively by the comparison of results in various communities, both in this country and abroad, and especially in relation to the infant welfare movement.

The latter is shown most conclusively by the history of our own national government. Our statesmen, not appreciating Lord Beaconsfield's well-known saying "that public health is the foundation on which rests the happiness of the people and the power of the country; the care of the public health is the first duty of the statesman," have conserved our forests, our mineral resources, our lands, our streams, and our animals. "But man, for whom all these should be conserved, is for the most part neglected, or left for the last consideration." Commercialism is still in the ascendant, as is shown by the millions annually appropriated by the national government for the protection of crops and animals, owing to their commercial value, compared with the paltry thousands appropriated for conservation of health and life of man, whose monetary value is not considered. Yet, it has been demonstrated by Professor Irving Fisher and others that in the United States approximately 3,000,000 people are constantly sick, at least one third of whom are in the working period of life. Allowing for the non-employment of one quarter of these, and assuming the average annual earnings to be $700, we find over $500,000,000 to be the minimum loss of wages, in addition to which the cost of medical attendance and nursing must be added; an annual loss to the nation of great magnitude. This same policy holds true in our municipalities. Appropriations for city improvements, protection of property, and development of ports in seaport cities, are large, for such development increases trade and adds to the commercial

standing of the city, while far more important from an economic view is the prevention of sickness and mortality, especially of the wage-earner. Yet, as the commercial value of health and life is not fully realized, appropriations to municipal health departments are exceedingly small.

Notwithstanding this attitude, great progress has been made in sanitary science, more particularly in European countries, where health work has come, largely, under national control and is free from local political conditions. It is a rare thing today to find in most continental cities a health officer who has not had special collegiate training for his work. The colleges in this country are not to blame, as many have already instituted courses, and confer degrees of "Doctor of Public Health" and "Doctor of Public Hygiene"; but our young men will not give years for their proper education for positions of this character, the tenure of which depends not upon efficiency, but upon political influence. This is the condition in the majority of our cities, although, happily, there are numerous exceptions.

The remedy for this evil lies in the organization of a national bureau or department of health, under whose general control all appointments should be made through civil service, to be terminated only by malfeasance in office, inefficiency, resignation, or death. Coöperation and aid of the national authorities would soon educate the community to abandon any local legislation that would not be in conformance with such organization. "In diseases which can travel from state to state, in diseases which can jeopardize the welfare of a commonwealth as a whole, state lines should not be considered." Municipal, county and state boards of health are phases in the development of a perfected whole, and should always exist, but hold the same relation to a national department of health that our cities, counties, and states do to our national government.

The many separate government bureaus now engaged in independent health work should be consolidated and coördinated in this national department of health, and have at least the authority over public health that the Inter-State Commerce Commission has over commerce. "Control of inter-state stream pollution would markedly decrease typhoid fever, control of quarantine and inter-state common carriers would remove a menace to the health of the travelling public. The coalition of investigation and coöperation with the many unrelated biological and pathological, federal, state, and private laboratories, would prove of inestimable value." These are but a few illustrations advanced as an argument for the creation of such a national department.

The Twelfth Census (1900) showed in some cities an annual death-rate in children under five years of age of over 100 per thousand of population. The fact that many of these deaths were preventable attracted attention, especially as the largest proportion of this mortality was in ages under one year, 25 per cent. of which were from diarrhea and enteritis, largely preventable.

This great and needless mortality, constituting over 30 per cent. of the total deaths of the United States, attracted public attention, and it was therefore in the early part of the present century that the first concentrated efforts were made to conserve child life. The following tables are presented as a means of comparing results in our larger cities.

TABLE 1.

DEATHS UNDER ONE YEAR OF AGE.

Cities.	Average number of deaths of infants under 1 year of age per 100 deaths from all causes.			Per cent. change.	
	1901 to 1905.	1906 to 1910.	1911 to 1913.	1906 to '10 from 1901 to '05.	1911 to '13 from 1906 to '10.
Atlanta	19.38	17.56	15.40	− 9.39	−12.30
Baltimore	22.58	21.38	19.06	− 5.32	−10.85
Boston	20.20	20.68	18.57	+ 2.38	−10.20
Buffalo	22.68	24.06	22.00	+ 6.08	− 8.56
Chicago	20.10	21.12	19.50	+ 5.07	− 7.67
Cincinnati	14.94	14.66	12.00	− 1.87	−18.14
Cleveland	25.02	25.14	22.00	+ 0.48	−12.49
Denver	13.38	13.34	12.20	− 0.30	− 8.55
Detroit	25.76	27.98	25.90	+ 8.62	− 7.43
Indianapolis	17.38	14.66	12.37	−15.65	−15.62
Jersey City	22.22	22.01	20.14	− 0.95	− 8.49
Kansas City, Mo.	16.42	16.40	15.40	− 0.12	− 6.10
Los Angeles	9.60	11.50	10.77	+19.79	− 6.35
Louisville	16.50	14.10	12.27	−14.55	−12.98
Milwaukee	26.08	26.62	25.50	+ 2.07	− 4.21
Minneapolis	14.86	15.72	15.90	+ 5.79	+ 1.15
New Haven	20.02	18.66	17.23	− 6.79	− 7.66
New Orleans	16.22	15.78	13.13	− 2.71	−16.79
New York	21.78	21.78	19.33	0.0	−11.24
Newark	20.60	21.10	19.73	+ 2.43	− 6.49
Philadelphia	18.98	20.44	17.73	+ 7.69	−13.25
Pittsburgh	24.14	24.26	21.20	+ 0.49	−12.61
Providence	21.42	21.36	18.13	− 0.28	−15.12
Richmond	20.72	20.26	19.27	− 2.22	− 4.88
Rochester	12.62	13.90	15.40	+10.32	+10.79
St. Louis	16.86	16.44	14.03	− 2.49	−14.66
St. Paul	21.70	19.58	18.43	− 9.77	− 5.88
San Francisco	12.30	12.16	9.83	− 1.14	−19.16
Seattle	15.14	14.94	12.43	− 1.32	−16.80
Toledo	16.70	16.62	15.53	− 0.47	− 6.56
Washington	19.38	17.66	14.43	− 8.87	−18.29

The figures in Table No. 1, although those most employed, are not absolutely fair for comparative purposes, as cities vary greatly in their per cent. of population at this age period.

birth registration, which in some places is far from satisfactory, it being estimated in one of our large cities that less than 50 per cent. of all births are recorded.

TABLE 2.

DEATHS OF INFANTS UNDER ONE YEAR OF AGE PER 1,000 BIRTHS.

Cities.	1900.	1910.	1912.	1914.
Atlanta	258.8	213	—	—
Baltimore	208.5	218	177.7	154.6
*Boston	173.0	126	119.0	103.4
*Buffalo	137.0	162	127	121.5
Chicago	134.0	281	—	132.7
*Cincinnati	155.3	131	103	—
Cleveland	163.6	150	137	118.4
Denver	146.6	163	—	—
*Detroit	176.5	179	132	122.4
*Indianapolis	153.7	123	101.5	102.2
Jersey City	175.6	204	149.8	105.1
*Kansas City, Mo.	165.1	154	166.8	—
Louisville	155.6	145	108	—
*Milwaukee	167.6	145	—	—
Minneapolis	95.2	109	72.4	82.7
New Orleans	197.9	162	102.3	112.2
*New York	170.5	125	105.3	94.4
*Newark	164.0	124	—	—
*Philadelphia	178.0	138	102.4	117.6
*Pittsburgh	162.1	150	126.7	115.2
*Providence	190.2	144	112.7	112.7
*St. Louis	146.3	115	97.3	103.4
St. Paul	91.2	132	96.1	79.5
San Francisco	136.2	108	100	—
Washington, D. C.	232.7	152	128	—

*" Cities where the reported number of births exceeded the population under one year of age by 10 per cent. or more, and, therefore, the ratio of infantile mortality given is probably approximately correct."

The figures for 1900 and 1910 are taken from the United States Census reports. The figures for 1912 and 1914 are obtained from local health officers.

Table No. 2, showing the per cent. of deaths under one year of age to each thousand births, would be the fairer method, if it did not depend upon the completeness of

The relation of mortality to the number living at the same age, therefore, seems to be the fairest method of comparison with the means we have at our disposal, and is shown in Table No. 3.

TABLE 3.

DEATHS UNDER ONE YEAR OF AGE.

Cities.	Average per cent. of deaths to those living.			Per cent. change.	
	1901 to 1905.	1906 to 1910.	1911 to 1913.	1906 to '10 from 1901 to '05	1911 to '13 from 1906 to '10.
Baltimore	22.36	22.18	19.73	− .8	−11.05
Boston	17.26	17.81	15.82	+ 3.18	−11.17
Buffalo	15.10	17.63	16.07	+16.76	− 8.85
Chicago	12.72	13.97	13.07	+ 9.82	− 6.44
Cincinnati	15.92	15.58	12.7	− 2.14	−18.49
Cleveland	15.81	14.65	12.37	− 7.34	−15.57
Denver	14.18	14.67	11.07	+ 3.46	−24.54
Detroit	15.73	18.33	18.33	+16.53	0.0
Indianapolis	15.48	13.48	11.53	−12.92	−14.46
Jersey City	17.65	16.70	13.03	− 5.38	−21.97
Kansas City, Mo.	15.76	15.26	15.22	− 3.17	− 0.26
Louisville	17.07	14.31	12.33	−16.17	−13.84
Milwaukee	14.22	16.32	15.80	+14.77	− 3.19
Minneapolis	7.90	9.54	10.07	+20.76	+ 5.56
New Haven	15.38	14.42	12.57	− 6.24	−12.83
New Orleans	17.53	16.98	13.20	− 3.14	−22.26
New York	16.65	15.68	12.50	− 5.83	−20.28
Newark	15.06	14.66	11.80	− 2.66	−19.51
Philadelphia	16.04	17.10	13.37	+ 6.61	−21.81
Pittsburgh	18.25	17.32	13.80	− 5.10	−20.32
Providence	19.24	17.83	13.30	− 7.33	−25.41
Richmond	21.82	20.26	18.23	− 7.15	−10.02
*Rochester	9.42	10.85	12.30	+15.18	+13.37
St. Louis	15.44	13.90	12.00	− 9.97	−13.67
St. Paul	11.13	12.02	11.50	+ 8.00	− 4.33
San Francisco	16.22	13.16	10.57	−18.87	−19.68
Washington	23.54	20.86	15.87	−11.38	−23.92

* "Returns to Census Bureau incomplete, considerable number of deaths omitted."

The best work now being done is in a city appropriating the largest sum per capita of population of any of the large cities to the health department, which tends to bear out the quotation appearing upon their official publications: "Public health is purchasable. Within natural limitations a community can determine its own death-rate."

Not until after the National Conference for the Reduction of Infant Mortality held in London in 1906, were efforts to reduce infant mortality thoroughly organized. This conference caused a general awakening,

and was followed by the formation, at first local, of associations in both Europe and America. These have continually increased in both number and influence, until today there are but few communities not realizing "that the great infant mortality is a national disaster," which constitutes the surest index of inefficiency of health administration, private and public.

The further study of the development of infant welfare work in the United States shows that the initiative, without exception, has been taken by private interests. Where these interests were successful and accomplished results, in a majority of instances through the education of the public, the municipal authorities were induced to recognize their full duties, and organize bureaus or divisions of "child hygiene." In most cities and states, this activity properly falls under the health department, but in the United States government is under the Department of Labor.

Municipal departments of child hygiene were organized first in New York in 1908, then in Philadelphia, Chicago, Detroit, Los Angeles, and Buffalo in 1910, in Boston, Cincinnati and Kansas City, Mo., in 1911, Milwaukee and Cleveland in 1912, followed later by Newark, Indianapolis, Rochester, Seattle, Providence, and others.

State control was given by Act of Assembly of Pennsylvania approved April 27, 1905, creating a state department of health. Under this power child welfare exhibits have been held, much circularization done, and organization of medical school inspection accomplished. In 1913 a law was passed by the New York legislature creating a division of child hygiene in the State Department of Health, as the result of the report of the special commission appointed by the governor in January, 1913, to make recommendations "as to changes in the public health laws" which was embodied in the governor's message to the legislature February 19, 1913; and among other things, advised that "each city with a population in excess of 10,000 and having an industrial population, should have one infant welfare station, and larger cities with an industrial population should have one such station for approximately each 20,000 inhabitants."

A division of child hygiene was created in the Kansas State Board of Health by Act of Assembly approved March 6, 1915, providing among other things that the "general duties of this division shall include the issuance of educational literature on the care of the baby and the hygiene of the child, the study of the causes of infant mortality and the application of preventive measures for the prevention and the suppression of the diseases of infancy and early childhood, and such other duties as are prescribed by the State Board of Health."

The United States government at a late date took cognizance of the importance of this subject, and by Act of Congress approved April 9, 1912, created a Children's Bureau in the Department of Labor to investigate "all matters pertaining to the welfare of children and infant life." This

Bureau collects information for publication. It has already issued pamphlets on "Birth Registration," "Aid in Protecting the Lives and Rights of Children," "Baby Saving Campaigns," "Pre-natal Care," "Infant Care," "Handbook of Federal Statistics," "Infant Mortality," "The Results of a Field Study in Johnstown, Pa., Based on Births in One Year," "New Zealand Society for the Health of Women and Children," and "An Example of Methods of Baby Saving Work in Small Towns and Rural Districts."

It acts as a clearing house for all private, municipal, and state agencies, through which information on any phase of infant welfare work is imparted, and endeavors to stimulate local interest in communities where it is most needed.

The only other national government activity is the Public Health Service, which has published at various times reports on "Milk Stations," a report of the "National Commissions of Milk Standards" and a booklet on the "Care of Children" compiled by the American Association for the Study and Prevention of Infant Mortality.

The first generally organized conference in this country on the prevention of infant mortality was held by the American Academy of Medicine at Yale University, November 1909, out of which grew the American Association for the Study and Prevention of Infant Mortality, which has carried on the work:

"Through studies and investigations by special and standing committees;

"Through annual meetings, the transactions of which form practically a year book on the subject;

"Through a campaign of education, by the publication and distribution of material on the subject; by correspondence from the home office, which as far as possible has served as a medium for the exchange of information on the part of the organizations engaged in baby saving work, or planning to do so; by use of the travelling exhibit."

Among the earliest municipal activities may be mentioned: The Good Samaritan Dispensary of New York, 1891; The Pasteurized Milk Stations of Nathan Strauss, 1892; Milk Stations in Rochester, New York, 1897; Milk Fund Association, Cleveland, 1899; commencement of child hygiene work by the Department of Health, New York City, and the Philadelphia Modified Milk Society, Philadelphia, 1903; Babies' Milk Fund Association, Baltimore, and the St. Louis Pure Milk Commission, St. Louis, 1904; Poor People's Modified Milk Service, Boston, Association for Improving Conditions of the Poor, New York, and the Chicago Milk Commission, 1905; Babies' Dispensary and Hospital, Cleveland, and Committee on Modified Milk Stations, Boston, 1906; and Louisville Babies' Milk Fund Association, Louisville, 1908.

Up to this time nearly all work had been concentrated on providing a pure milk supply for infant feeding, as diarrhea and enteritis, constituting the greatest preventable menace to infant life, until recently, was believed to be entirely caused by rapid deter-

ioration of uncooled or improperly kept milk, especially in hot weather. The mortality rate in the United States from these diseases was but little affected until after 1910, although local efforts to improve the milk supply showed results in certain communities prior to that time, as shown in Table No. 4.

Improvement and efficiency has been marked from year to year, showing progress from the earliest effort to improve the milk supply, until the following activities are now incor-

TABLE 4.

DEATHS FROM DIARRHEA AND ENTERITIS UNDER TWO YEARS OF AGE PER 100,000 OF POPULATION.

Cities.	5-year averages.		3-year average.	Per cent. change.	
	1901 to 1905.	1906 to 1910.	1911 to 1913.	1906 to '10 from 1901 to '05.	1911 to '13 from 1906 to '10.
Baltimore	129.4	118.0	99.1	− 8.8	−16.0
Boston	107.4	99.2	87.9	− 7.6	−11.4
Buffalo	112.0	139.7	127.2	+24.7	− 8.9
Chicago	104.4	138.0	137.9	+33.2	− 0.7
Cleveland	104.0	132.4	135.6	+27.3	+ 2.4
Cincinnati	77.7	86.2	65.6	+10.9	−23.9
Denver	47.4	55.1	30.6	+16.4	−44.4
Detroit	99.6	102.8	101.2	+ 3.1	− 1.5
Indianapolis	48.1	68.4	51.8	+42.2	−24.3
Jersey City	125.9	142.7	95.6	+13.3	−33.0
Kansas City, Mo.	46.1	45.7	68.6	− 0.9	+50.1
Louisville	50.2	37.9	33.6	−24.5	−11.3
Milwaukee	95.9	119.0	100.1	+24.1	−15.9
Minneapolis	41.9	55.8	37.7	+33.2	−32.4
New Haven	110.0	91.7	68.4	−16.6	−25.4
New Orleans	113.8	130.3	109.7	+14.5	−15.8
New York	145.0	133.8	82.9	− 7.8	−38.1
Newark	106.5	112.9	104.0	+ 6.0	− 7.9
Philadelphia	96.8	133.5	104.0	+37.9	−22.1
Pittsburgh	170.2	169.1	126.2	− 0.6	−25.3
Providence	134.7	120.2	73.1	−10.7	−39.2
Richmond	127.2	133.6	116.3	+ 5.0	−12.9
Rochester	51.6	82.6	87.9	+60.0	+ 6.4
St. Louis	62.8	73.7	76.4	+17.4	+ 3.7
St. Paul	43.7	58.0	45.4	+32.7	−21.7
San Francisco	57.7	47.1	37.3	−18.4	−20.8
Washington, D. C.	118.8	99.0	66.0	−16.6	−33.3

porated in most well equipped health centers controlling infant life.

Milk.—Milk stations were primarily established to provide milk of good quality for infant feeding, for which mothers and care-takers were compelled to call. Later, milk was delivered to the house, at cost, below cost, or free. In the latter case the expense was borne in many cities by private relief agencies. It took but little practical experience to demonstrate that the provision of a pure milk supply was of but little benefit if the milk was improperly kept after its receipt in the home, so the education of the mother and care-taker became most important, and the visiting nurse was added to the milk stations for this purpose. Then physicians were employed to advise mothers how properly to care for sick babies.

Clinics.—Clinics were thus established with daily service, in some cities, during the hot weather, in others during the entire year. The education of the mother became of more and more importance, so that demonstrations, lectures, and distribution of literature were added features of the medical dispensaries and clinics, so they then in reality became,

Welfare Centers.—Welfare centers, of which there were in 1914 a record of forty-three in thirty different cities of over 50,000 population, twenty-nine of which were supported by private benevolence. Dr. Philip Van Ingen of New York, in a recent article, stated he had data "concerning 204 such centers in thirty-nine cities."

Visiting Nurses.—The visiting nurse is the most important function in the reduction of infant mortality. In most cities a nurse is sent to all tenements and poor districts upon receipt of information of a birth or expected birth. Subsequent visits are not made without the consent of the mother, attending physician, or midwife. The nurse gives instruction in child hygiene, care of the baby, general sanitation and the importance of breast-feeding.

Dr. Josephine Baker, Director of Child Hygiene in New York, in an argument for additional nurses, demonstrated that "babies can be kept under continuous home supervision at a cost of sixty cents per month per baby, as compared with two dollars per month per baby under care of milk stations." She further says "the solution of the problem of infant mortality is 20 per cent. pure milk and 80 per cent. training of the mothers. The infant milk stations will serve this wider usefulness when they become educational centers for pre-natal instruction and the encouragement of breast-feeding and teaching of better hygiene, and the mothers instructed to buy the proper grade of milk at a place most convenient to the home." The proper home care of infants by their mothers in relation to mortality is forcibly demonstrated by the experience in Lowell, Mass., and Paris; in the former city during an extended labor strike in the mills, women could not work and perforce were compelled to remain at home and nurse or give constant care to their children. During this period infant mortality decreased, while the general mortality, as a result of privation and poverty, increased. And

in Paris, during the siege in the Franco-Prussian war, when opportunity for outside work was cut off, and women were compelled to remain at home, the general mortality doubled, while infant mortality fell off 40 per cent.

Housing and Sanitation.—Bad housing and sanitation bears directly on infant mortality. A large number of diseases are produced by conditions coming under the head of bad housing. Lack of cleanliness, bad ventilation, poor light, bad drainage, etc., are being combated by the visiting nurse, but the abatement of nuisances must be accomplished by public health officers, who, in a few communities, have been ably assisted by local and private housing commissions, and the National Housing Association, whose efforts in improving the condition of the poor, and the lowering of mortality, have been demonstrated where their activities have been most needed.

Midwives.—The supervision and control of midwives are under state and municipal government in many parts of the country. In thirteen states, midwives are allowed to practice without restraint, and in fifteen others, there is no control or requirement for training or licensure. In some cities where examinations for licensure are required, schools for instruction have been started; for example, New York operates a school in connection with the Bellevue Hospital; in Philadelphia a similar course has been inaugurated in connection with the Philadelphia General Hospital and the Preston Retreat, and continued until 1913, when the control of midwives was vested in the "State Board of Medical Education and Licensure" by Act of Assembly.

Day Nurseries.—Day nurseries are very numerous. They provide daily care for babies and children, and although some are most worthy charities, yet others are insanitary, poorly managed, and productive of harm. These nurseries are rarely under municipal control.

Little Mothers' Leagues.—Little Mothers' Leagues, inaugurated in many cities, have awakened great interest in the care of infants, and are today an important feature in imparting knowledge in the home, and eventually will prove of inestimable value in the improvement of the future race as these young girls become mothers. Classes of girls are formed, generally in connection with the public schools. Lectures and demonstrations on the care of the baby are given by physicians and nurses. In many cities examinations are held and medals or other insignia are awarded at the end of the course to those who have put their knowledge to the best practical use.

Boarding Out Infants.—The municipal supervision, in many cities, of the boarding out of infants has been important in bringing under control the so-called baby farms, which have frequently been in the past an important feature in increasing infant mortality, in encouraging immorality, and the deserting of babies by their parents.

Education and Publicity.—"Philadelphia is the first city to teach the vocation of motherhood to girls in public schools as part of their curriculum." This instruction was made part

of the Domestic Science course by the Board of Education in 1914.

The Western Reserve University of Cleveland has recently added to the curriculum of the senior class of the Medical School eight hours for the study of "Practical Training in Social Medicine Pertaining to Infant Welfare Work." The importance of this can be attested by Civil Service examiners, who have noted the lack of knowledge in this particular branch of hygiene on the part of physicians taking examinations for interne-ships in hospitals and various positions in public health service.

Among the first to use publicity in the campaign for child welfare were Nathan Strauss, of New York; the *Delineator;* the Russell Sage Foundation; the Metropolitan Life Insurance Company, and a few other private agencies. Special note should be made of the work of the Metropolitan Life Insurance Company, as great impetus, irrespective of motive, has been given publicity by their work of recent years. Much good has been accomplished through the issuance of a book called "The Child," over three million copies of which have been distributed by the physicians and agents of this company to its policyholders. This publication was followed by a pamphlet on "Milk and its Care," written by Professor Rosenau. Nurses are provided free for the care of the sick, and educational work in over seventeen hundred cities and towns. The Company, moreover, offers it services to all health officers.

Publicity by municipal departments has been obtained through circularization, milk stations, settlement houses, libraries, public schools, visiting nurses, medical inspectors, policemen, posters with printed instructions and pictures sufficiently attractive to find lodgment on the walls of the home, and newspapers, most of which have generously opened their columns for the education of the public in their own betterment.

Baby Contests.—Baby contests have been held for publicity purposes in many of our large cities, frequently under the auspices of some particular newspaper which has awarded prizes for improvements shown, and thereby added much to the public interest.

Exhibits.—Exhibits have proved among the most instructive form of publicity. In cities like New York, Chicago, and Philadelphia, they have been very elaborate and largely attended. The results obtained demonstrated the importance of this feature of the work to such an extent that the American Association for the Study and Prevention of Infant Mortality prepared a travelling exhibit first shown at the International Congress of Hygiene in Washington in 1912, when it was awarded one of the few diplomas of special merit. This exhibit has been in the field ever since and has been shown in twenty-eight cities. "The actual showing of this exhibit has been represented by but a small part of its usefulness. It has served as a basis for a number of exhibits," which have been adopted by many boards of health, a number of universities, chambers of commerce and other associations. Complete photographic sets of the exhibit, together with circulars of explanation

and instruction have been furnished many organizations.

Floating Hospitals.—Floating hospitals have been in use in certain localities. The best illustration of their efficiency is in Boston where this open air service was established and is maintained by private subscription. A large steamer leaves the wharf at nine o'clock in the morning during the heated term, cruises or anchors in the harbor, and returns at five o'clock in the afternoon. A sufficient number of physicians and nurses are in attendance to care for two hundred children per day. This is a worthy charity, but expensive. It is believed that the same amount of money spent in a more practical manner would give better results.

Pre-Natal Work.—Mortality during the first year of life in all registration cities of the United States has been decreasing. In 1909 this mortality was 22.31 per cent.* of the total mortality; in 1910 it was 19.95 per cent. and in 1913, 17.9 per cent. Yet a careful study of vital statistics shows that the number of deaths under one month of age has been continually increasing up to this period and especially during the first days of life; showing that efforts already exerted for the prevention of infant mortality, although successful for later age periods during the first year, did not affect

TABLE 5.

DEATHS BY AGE PERIODS, UNDER ONE YEAR IN THE REGISTRATION AREA OF THE UNITED STATES.

Age.	All registration cities.		Rural parts of registration states.	
	*1910.	1913.	1910	1913
Less than one day	10,614	11,694	6,573	9,668
One day	5,254	4,401	3,380	3,350
Two days	3,174	3,094	1,947	2,284
Less than one week	25,372	25,326	16,071	20,006
One week	6,284	5,680	3,956	4,543
Two weeks	5,150	4,221	2,920	3,273
Less than one month	41,420	38,692	25,392	30,285
One month	11,597	8,816	5,910	6,096
Two months	9,754	7,410	5,107	4,815
Three to five months	22,832	16,960	10,443	10,734
Six to eight months	16,828	12,637	8,209	7,259
Nine to eleven months	12,798	9,939	6,249	5,792
Under one year	115,220	94,454	62,309	64,981

* As the registration area of the United States in 1910 included 58.3 and in 1913, 65.7 per cent. of the population, an actual difference of population of 9,454,822 (15 per cent.). it would be impossible to make a fair comparison without the correction of the 1910 figures which has been done.

this early mortality, due to causes acting before birth; and concentrated attention upon the importance of pre-natal work which, during the recent past, has become more prominent and today plays a large part in the campaign to combat infant morbidity and mortality, the result of which is beginning to appear in our vital statistics.

Table No. 5 shows the comparison of mortality in cities and rural districts for various age periods under one year for 1910 and 1913. Here again there is a possible source of error, for in order to secure accuracy, we must assume that the same relation in increase of population holds for all age periods. In the cities a marked reduction has taken place in every age period, excepting under one day, demonstrating most forcibly the necessity for increased research work and study of pre-natal conditions responsible. In the rural districts the mortality in 1913 in nearly all age periods shows an increase, amounting to 18 per cent. in the total deaths under one year; while for the same time in the cities there is a decrease of 4 per cent. As but little effort in infant welfare work has as yet been made in the rural districts, the result is as expected, and places the credit for the reduction in this mortality to the campaigns waged in the cities. The earliest systematic pre-natal work has been done in New York, Cleveland, Philadelphia, Boston, St. Louis, Chicago, Baltimore, and some of the smaller towns, of which Fall River, Mass., may be specially noted.

A synopsis of the work in a few of our large cities will serve to show the varied methods adopted in different locations.

New York.—In 1891, milk was dispensed in the summer to sick babies by the Good Samaritan Hospital. In 1892, Mr. Nathan Strauss founded pasteurized milk laboratories in various parts of the city. In 1903, the Health Department appointed physicians and nurses to visit families of new-born babies. In 1905, The New York Association for Improving Conditions of the Poor entered into a vigorous campaign for clean milk, which movement was initiated by the Commissioner of Health. In 1906, the New York Milk Committee, supported by private means, was formed to investigate the entire milk problem; and within two years, engaged in active field work, by installing milk depots, and employing nurses to do instructional field work in connection therewith. They encouraged breast-feeding, and educated the mother in the care of the infant, and did experimental work to compare results "obtained by the continued use of pasteurized and of raw milk to determine" which was the more economical and satisfactory method of saving infant lives. The work of this committee and of Nathan Strauss has been largely instrumental in the pasteurization of ordinary market milk now required in many of our cities. In 1908, the Division of Child Hygiene in the Department of Health was organized with a chief, five assistant chiefs, sixteen supervising inspectors, one superintendent of nurses and one hundred and ninety-five district nurses. In 1909, the division took under supervision, mid-

wives, boarding places for children, day nurseries, and other institutions for the care of children. In this year Little Mothers' Leagues were started in the public schools, and in 1910 appropriations were increased sufficiently to maintain fifteen infant milk depots. In the same year twenty-three additional milk stations were opened in New York, and in 1911, an Association of Infant Milk Stations was formed to prevent duplication of work and bring the eight existing organizations, maintaining seventy-five stations, under central control.

Philadelphia.—Although some desultory and individual effort had already been exerted, the first organized movement was by the Philadelphia Modified Milk Society in 1903. Modified milk under various formulæ was delivered to mothers calling at the various stations in different parts of the city. In the spring of 1907 the Department of Public Health and Charities organized volunteers from various churches into committees on visitation of homes of young mothers. Philadelphia was first in the field to organize clinics for the treatment of poor school children. In 1908, an eye clinic, and in 1910, a dental clinic was established in the Bureau of Health. Prior to this time dental work had been performed in private institutions made possible through appropriations by councils for this purpose. In 1908 The Babies' Alliance was formed, to extend the work already started in every ward in the city, and to carry on a publicity campaign by circulars, bulletins, baby contests, Little Mothers' Leagues, and the newspapers. There was inaugurated in 1909 an aggressive campaign against the use of soothing syrups and other proprietary medicines, which received the official support of the Retail Druggists Association of Philadelphia. Classes of mothers were held once a week in different sections of the city, and prizes were given by the Babies Alliance and Light House to mothers for those babies showing the best results. A novel feature of education was introduced at this time by the Bureau of Health, consisting of large paper bags, upon which simple instructions to mothers were printed and placed over every bottle of milk sold. Every milk pitcher or can left on the door-step for milk was also covered with one of these bags. The latter served the double purpose of distributing information and preventing contamination of milk served loose. The success of this movement was made possible by the hearty coöperation of the milk dealers. In 1910, the Philadelphia Conference on Summer Work for Mothers and Children was started. It secured the coöperation of one hundred and fifty-seven private associations, covering day nurseries; settlement and neighborhood houses; social betterment agencies having facilities such as baths, camps, mothers' clubs, milk stations, etc.; agencies providing temporary shelter for mothers and children; modified milk stations; hospitals and dispensaries; associations providing convalescent care or outing; agencies visiting and inquiring into the needs of mothers and children in their homes; and the various bureaus of the City Department of Public

Health and Charities. This work, although financed privately, was conducted under the auspices of the City Department. The Philadelphia Modified Milk Society added milk stations, the Bureau of Municipal Research supplied one clerk and two nurses, the Phipps Institute, one, and the Starr Centre, two nurses. Work started May 1, and the publicity obtained proved sufficient incentive to have the municipal legislative body immediately appropriate sufficient money to employ one supervising nurse and eight visiting nurses, which constituted a commencement of a division of child hygiene. The district physicians and medical inspectors of the Bureau of Health were employed in this division during the summer recess of the public schools. A milk station, a clinic, an exhibit where lectures were given daily, were established on one of the city piers, and a hospital for sick babies on another. All requests for medical or nursing aid could be, day or night, forwarded to the central office in the Bureau of Health through the police or fire station houses, by telephone. Bulletins, posters and circulars were distributed largely through the police department. In 1911 an elaborate milk show was held at which the attendance was 110,681. In an adjoining auditorium, lectures and moving pictures were given daily. A commission was appointed by the mayor in 1910 to study the entire milk problem. An elaborate report was published February 15, 1911, which aided materially in securing public endorsement of improved rules and regulations authorized by Act of Assembly, approved April 27, 1909, which finally brought the milk supply of the city under the control of the Department of Public Health and Charities.

A Child Hygiene Committee was organized in 1911 which, in coöperation with the city health authorities, held a large Baby Saving Show visited by 67,507 people. Lectures and moving pictures were a daily feature. The benefit derived from this show was so great that it was converted into a travelling exhibit, and has been almost continuously used in different parts of the city. During the year 1913 alone, the attendance was 351,860. The Child Hygiene Committee changed its name in the year following to the Child Hygiene Association, which on September 30, 1913, incorporated under the title Child Federation, "to actively advance by original and constructive methods the best interests of babies and children in Philadelphia." They turned over to the Board of Education the Little Mothers' Leagues, and secured the introduction of the course on child hygiene in the public schools, as already noted. In 1914, through the efforts of this Federation, the Babies' Welfare Association, consisting of eighty-four various activities partly engaged in similar work, was organized to prevent duplication of labor by coördination and coöperation; thereby creating a central supervision of the various associations, and becoming a clearing house for all interested in child welfare work, with a central office in the Bureau of Health. Committees were appointed to do special research work, the effect of which is

already felt in the creation of most effective health centres, the better control of baby farms, lying-in establishments, milk stations, and day nurseries.

Cleveland.—The first effort to reduce infant mortality was made in 1902 with the formation of the Milk Fund Association which supplied modified milk to babies who were brought to the office of the Association. On July 5, 1906, the Visiting Nurse Association, an organization sending nurses into the homes of the sick, effected a coöperation with the Milk Fund Association. In December of the same year, the Babies Dispensary and Hospital was incorporated, which, at a later date, took over the already existing organizations and opened in May 1907 a dispensary in a converted frame building on property purchased, where both sick and well babies were brought. As the work increased, dispensaries were opened from time to time in various portions of the city, until 1908, when there were eight, for which the central office acted as a clearing house. In 1910, permanent buildings were erected for a central dispensary and milk laboratory. Through practical work and a publicity campaign, city councils in 1911 appropriated ten thousand dollars to the Board of Health for infant mortality work, making the Babies Dispensary advisors to the Board "in the manner of application of funds," and ended in establishing a department of child hygiene in the Board of Health, with the medical director of the Babies Dispensary and Hospital as director thereof. In 1912, all the dispensaries of the private associations were turned over to the municipal department, so that all the prophylactic work was conducted by the municipal government, and the care of the sick by the Babies Dispensary and Hospital.

It is impossible to cover all details that have a bearing on the progress of recent public health work, but the foregoing history of a few of our cities is a fair exposition of the methods employed in infant welfare work. The results of these methods are found in a careful study of vital statistics. Notwithstanding the great progress, it is well known that but a beginning has been made, as the field of opportunity is ever broadening, and new problems constantly arise, that at the time appear almost insurmountable.

Let us trust the results already obtained may prove an incentive to renewed efforts that, in view of past experience, will undoubtedly place in the list of preventable deaths, prematurity and congenital debility, which now exact such a toll during the first few days of life.

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THE MUNICIPAL CONTROL OF DIPHTHERIA—A NEW METHOD.

Dr. W. G. McKay,
Jacksonville, Fla.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 2, 1914.

UNTIL 1913, the Jacksonville Board of Health followed the customary methods in handling diphtheria cases, that is, quarantine of all cases until two successive negative cultures had been obtained, followed by the disinfection of the rooms occupied by the patient. For nearly two years the Board of Health has carried out a plan for the control of diphtheria, which has been used in institutions, but probably it is new as applied to municipalities. In this method we have in view not only the isolation of diphtheria cases, but also the early recognition and isolation of diphtheria "carriers."

Our methods briefly summarized are as follows:

As soon as a case of diphtheria is reported, a nurse is sent to the house and cultures are taken from all the other members of the household. If any "carriers" are found, they are isolated in the same manner as though they were a case. If the "case" has been attending the public schools, cultures are taken from all the pupils and teacher of the room attended, and all "carriers" found are quarantined.

When two negative cultures have been obtained from a "case," cultures are again taken from the members of the household, and if "carriers" are found, the quarantine is continued until the "carriers" have had two successive negative cultures.

As most cases of diphtheria occur among children of school-going age, efficient school inspection is of great value in the control of the disease.

At the beginning of the school year, a preliminary survey of the schools is made and cultures are taken from all children who complain of "sore throat" or whose throats look at all suspicious of diphtheria. In this early survey some few cases and numerous "carriers" are removed from the schools before they can become a focus of infection. The successful employment of this method of diphtheria control is dependent largely on two factors: efficient school inspection and easy access to an efficient laboratory.

The use of this method can keep a laboratory very busy, for there may be a very large number of cultures to examine, especially if several cases occur at the same time among school children. At the beginning of the school year in 1913, there was a mild epidemic of diphtheria among the school children and frequently there were two hundred or more cultures to examine daily, including school cultures, "contacts" and release cultures.

We were very fortunate in having the Central Laboratory of the State Board of Health located in Jackson-

ville, as Doctor Hanson very kindly took a great deal of this work off my hands, and during the past year has handled all except the school cultures, which were examined in the City Laboratory. The school cultures are taken by the school inspectors or school nurses and the cultures from the "contacts" are taken by the school nurses or by the physician in charge of the case.

During the past two years we have kept quite complete records of our cases and "carriers" and some interesting data has been obtained. The majority, 76 per cent. of the cases among school children occur among those in the first four grades. Only eight grades have school inspection. 64.7 per cent. of "cases" and "carriers" have abnormal tonsils. In 45 rooms examined, 1,634 pupils were cultured and 97 "carriers" found, a percentage of 5.32.

During 1913, 36 "carriers" were treated with a lactic acid spray. A bouillon culture of bacillus acidi lactici was used and was sprayed in the nose and throat several times a day. The majority of "carriers" used some chemical antiseptic, and from the data we have collected there is very little difference in the length of quarantine in the two methods.

There has been less than a third as many cases up to the first of December this year as there was last year during the same period; but this method of diphtheria control has not been in force long enough to draw any definite conclusions.

I have not gone into the question of the virulence of the diphtheria bacilli found in the throat of "carriers" but the Board of Health has taken the stand that it is wiser, for the sake of the community at large, to consider "carriers as infective as cases, and to treat them accordingly."

Discussion.

Prof. B. L. Arms (*Galveston, Texas*): Our experience in the examination of cultures for carriers was taken at the suggestion of one of the men in Boston who saw in that a panacea for all diphtheria. If we could take a culture from every school child at the opening of the school year, there would be no diphtheria. Consequently, at the opening of the schools in 1909 we had cultures from all children in one ward of the city. We took two cultures, from the nose and throat of each pupil and teacher in that district, taking them the first four days in the week and repeating it the following week. We had in the two weeks some 8,233 cultures. In our series, we found practically 1 per cent. of the children carriers, but we found that there were no clinical cases from those and not one of the clinical cases in that district could be traced to any of those carriers. There was no diminution in the number of clinical cases in the ward that year. Our conclusion was that, in case of an outbreak, then was the time to take cultures, and I certainly believe in taking cultures from all contacts, in either the school or the family, and we tried to get the Galveston Board of Health to do that at that time but they never felt that they could.

Dr. C. E. Terry (*Jacksonville, Florida*): The method offhand seems like a rather cumbersome one and in discussing it with several members of this Association before we instituted it, we were told that we would get into all kinds of trouble if we started anything like that. As Doctor McKay stated in the beginning of his paper, it was instituted in what promised to be a little outbreak of diphtheria. It was on the increase

when we started it but there were not a great many cases in the city at that time. We started the method just about the time the schools opened. The diphtheria had been increasing before the opening of the schools, and we noticed as we went along taking these carrier cultures, that we began to find a smaller percentage of carriers after a week or two than we had been finding in the rooms from which we had removed cases or carrier cases, and we attempted to make a prophecy that although the cases were still increasing as they were at the time, when we noted a decrease in the percentage of carriers found, that the cases themselves would soon decrease, and in the privacy of our own office we made that prophecy, and to one or two intimate friends outside, that in about a week or ten days there would be a marked dropping off in the cases reported in the city. As a matter of fact, I haven't got the figures with me, I forgot to get them this morning, but as a matter of fact there was a very marked dropping off, in fact such a marked one that it was almost a perfect vindication of the institution of the method. From about three or four of the school districts where diphtheria had been rapidly increasing and where we had quite a large number of cases under quarantine, the cases reported at the expiration of this period of ten days after we had noted a decrease in the number of carriers found, the percentage of carriers found, of contacts with cases, we had a very marked decrease in the number of carriers. It caused some little discussion among the public, among the families that we cultured, and we put one or two stories in the paper about diphtheria carriers and disease carriers generally, and I am glad to say that, beginning with a few days after those stories appeared, we had requests from parents saying "My child has got a little sore throat, does not seem sick, I don't want to call the doctor because I can't afford to if it is unnecessary; won't you send out and take specimens and see if it is diphtheria?" Which we were glad to do. We have had no opposition, practically, only from a few unthinking persons, but very, very little, and I think the public is educated as to what a disease carrier is; the school children certainly know, and they are first class instructors and I think their parents know pretty well. We found that the period of carriage in household specimens, that is, where we found a case we would swab the family, or where we found a carrier we would swab the family, the percentage of carriers found where a carrier case was the cause of the taking of the swab, was larger than where a case was the cause of the taking of the swab. Usually when a case developed, that patient was fully and promptly isolated from other members of the family, but where we found a carrier in the family, we found a greater proportion of the other members of the family carriers than where cases were the cause. The average duration in a carrier was about 9 days. The longest carrier we had under quarantine was 34 days, the shortest, two or three days, but the average period was about 9 days and we don't consider it a hardship in view of the results which we apparently obtained, to quarantine even a large number of school children for that period of time. Another advantage is that we prefer to operate this method while schools are open, we don't think of closing them, and we have the children under much better control and can get much quicker results during the school term than by the same method during school vacation. It has been customary on occasions to close the schools when diphtheria was present, but they have not been closed and will not be closed. Where we quarantine a carrier, we feel it incumbent on the health department to see to the releasing of that case. A few have called their family physician, but the vast majority, probably 98 or 99 per cent., rely on us entirely, are glad to have us take charge of the case and all that is done by the nurses. We tried recommending and furnishing free the young culture of the lactic acid bacillus. Doctor Mayo, I think, read a paper at the last meeting of the American Medical Association. We did not find that the use of that culture, even used carefully, made much difference in the period of quarantine, but tried to go to these houses and take cultures every other day or so until they were released. If we get a positive today from the throat, we don't take a culture till day after tomorrow. If we get a negative today, we take a second tomorrow, so as to release them as promptly as possible; and on the whole I believe we have got results. It is too early to say yet, but we have had very much less diphtheria during the year, and several times during the year, groups of two or three or four cases have cropped out, but they have not given rise to others. We have had the neighborhood

quarantined and school rooms swabbed and have not had a tendency to have the disease spread all over the city since this method was instituted.

Dr. Frank L. Wright (*New Haven*): I would like to report that in New Haven we have been doing this same method every year, except that we have not taken cultures from all the school children. We have taken cultures from all the children in the house, and taking a 12 or 16 family house, it is no small job; we have taken cultures of all the children and as many adults as possible, in those cases. We think we are seeing results. For something over a year we have done absolutely no terminal disinfection, depending entirely on negative cultures, and have yet to see a recurrent case.

Dr. Chesley (*Minneapolis*): I am very much interested in this so-called new method. I don't think it is very new in the practice, but I don't believe it is necessary to take separate nose and throat swabs, and I believe that, in justice to carriers, virulence tests should always be done. In Minnesota it has been the custom for a considerable period of time, several years, to isolate and test for virulence any case, clinical or otherwise, in which the bacilli persists for 30 days after the date of first symptoms, and when we find that the organism shows no virulence in a test, we release without fear any further restrictions on that patient. We do find, however, that practically it is impossible to find a carrier intimately associated with a clinical case showing a non-virulent organism and that the organism occasionally is located in the nose only. The danger I believe from carriers is chiefly in proportion to the amount of secretion from the nose and throat. I think that a carrier which can have diphtheria organisms that are virulent and without any excessive secretion, may be associated with children even without any one developing clinical diphtheria, but as soon as a condition arises which gives an excessive secretion, then trouble follows, and I think that probably in Doctor Chapin's method, the amount of nose and throat discharge has more to do with success than anything else.

Dr. G. W. Goler (*Rochester, N.Y.*): It is very comforting to think that a good many municipalities are trying to control their diphtheria not only by oversight of carriers but in other ways. We have in Rochester a hospital for the treatment of infectious diseases, including diphtheria. We have one man who takes 95 per cent. of all the cultures. When a case of diphtheria is reported to us over the telephone, the telephone clerk tries to get something like the following information: "When do you call? How sick is your case? Is the breathing bad? Has it enlarged glands? Are there children in the family?" If so, we don't wait for a culture, but advise the doctor over the telephone what he is to do for the case, how much antitoxin to give, whether we think the case needs intubation; in other words, we make a sort of telephone diagnosis of the severity of that case. "Did you give antitoxin subcutaneously or intramuscularly or intravenously?" If there are any other children in that family going to school, the medical inspector in that school goes there, looks over the children in the school and puts to one side those who have apparently inflamed throats. Cultures are made on those throats and if any carriers are found, they are excluded. To the family assistance is offered in the way of the intercutaneous administration of antitoxin, etc. The treatment of carriers is what I tried to get out of Doctor Terry, and he wouldn't say anything about it. What are we to do with these carriers? How are we to get rid of the organisms in their throats? Aside from cleaning their teeth and cleaning out their noses and throats, that is, taking out their adenoids, I fail to see anything in my experience that has offered a basis of assistance in the treatment of carrier cases of diphtheria. All the sprays, all the applications of any sort whatever, are worthless. As a disgusted medical friend of mine said some time ago when he was asked by a not over intelligent physician what he believed to be best for the treatment of diphtheria, he said, "I don't know of anything but spit."

Dr. Frank L. Wright: Doctor Goler hasn't told us what he does with his carrier cases.

Doctor Goler: Yes, I said, aside from the excision of tonsils and removal of adenoids and cleansing of teeth, that is the only way we find to get rid of our carriers.

Doctor Wright: Do you quarantine them?

Doctor Goler: Oh yes, we keep our carriers just as we would diphtheria.

Doctor E. C. Levy (*Richmond, Va.*): We have been following this method for two years and I had in Richmond one very interesting class of cases. Our medical inspectors two years ago

began to notice in a considerable percentage of diphtheria in school children, evidences of chronic nasal diphtheria. Many of those cases were of months' duration during which time they had been going to school. In at least two such cases several children had been going for daily treatment to a laryngologist in the city, going to the office and having instruments used that had been used on others, too often without proper sterilization. This medical inspector for some reason or other gave these children antitoxin. I told him I could see no way in which antitoxin could possibly have any effect, but if he wanted to try it, go ahead. The cases were nearly all of many months' duration, scarcely simple bacteriological cases, because they did have some clinical symptoms. Very remarkable to relate, in every instance, within a week or ten days, the nose trouble stopped and the organism just cleared. I don't know why. It is not logical as I see it. Another thing Doctor Chesley brought out, it seems to me we ought not to be confused by the enormous proportion of individuals in whose noses and throats we can find organisms morphologically resembling diphtheria bacillus. That is altogether in finding that in a house or school room in which there is a case of diphtheria, in those cases we can safely assume that those organisms are diphtheria bacilli.

Doctor Goler: I neglected to speak of the Shick method—if any one has had any experience with it.

Dr. Chas. J. Hastings (*Toronto*): As you will perceive, Doctor Levy and myself have the platform, so we will speak in succession. This problem of the carriers, as you will recall the experience they had in Baltimore, where I think they found, from the extensive investigations they made there, that 3 per cent. of all the school children in Baltimore were carriers. Now we had thought of undertaking this in Toronto, too, but when we got a vision of 15,000 swabs that we would have to examine and then repeat those over and over and also quarantine probably 15,000, we saw rather a severe problem ahead of us that we did not feel disposed to tackle. Our practice in Toronto is wherever we have a case of diphtheria reported from any institution, that we have swabs taken of all the possible contacts in connection with that institution, to make sure that there are no carriers, and the same is true in regard to all schools, and all the contact cases are swabbed, both nose and throat. So far as the treatment of the carriers is concerned, we quarantine the carriers. Of course we have quite a number of cases reported of carriers from the medical inspectors of the schools. We quarantine the carriers, but it is a limited quarantine, that is it is not as rigid as that under ordinary circumstances; we simply quarantine the patient. We quarantine the carrier, but no other members of the family, and I don't think that one is warranted—there would be no object in our taking that precaution. Now we give the families, however, the option; if they prefer to have all the contact cases in the family swabbed, rather than to have all the contact cases put under quarantine for the full time of incubation of the disease, why we do so. But otherwise than that, we felt that it would be almost too great an undertaking for a city of half a million or over. I think for smaller municipalities it is quite justifiable; in fact I think it is a proper procedure and I think they can hope for good results. I do think, however, that it is very, very important to call into requisition the valuable services of the guinea pig if we are going to arrive at proper conclusions as to which the most emphasis should be placed on. Is there any further discussion?

Doctor Gorder (*Baltimore*): I don't think I can add anything to what has been said. We isolate the carriers where they are in school and treat them very much in that particular as we do the diphtheria cases. We do not isolate the family as rigidly, and we have done some work on guinea pigs in those obstinate cases of carriers, but we feel that we have a great deal to learn on the subject yet and I come here more to learn than to teach.

Doctor McKay: Speaking of carriers, we only quarantine the carriers; we don't quarantine the family. The carrier is the only one that has to stay in; the rest can go about their business.

Mr. Wells: I want to make a motion to this effect;

"*Resolved*, that the routine disinfection of schoolrooms after a report of scarlet fever or diphtheria, is not recommended by the Association."

My reason for making that motion is that the proprietors of certain disinfectants have pes-

tered the life out of certain boards of education in the country and I have all I can do to hold our own Board of Education down to the ground. Some Boards are considering at the present time very seriously the adoption of a resolution to require disinfection of the classrooms after a report of a case of diphtheria or scarlet fever, and it seems to me that if such a resolution were adopted by this Section, it might strengthen some health officers who are trying to educate the public into the recognition of the fact that it is the carrier, not the school or individual patient or school room that is the source of infection.

The resolution was seconded.

Doctor Hastings: There are just two or three things I would like to say. There is a similarity between modern theology and modern sanitation. You can all remember when you were shaking over hell fire and all that sort of thing, but you don't hear anything of it now. It was a long time before the ministers had the courage to really say from the pulpit that they didn't believe in material fire, hell, etc., and I think probably advisedly so because in the olden times they found it necessary to terrify people along that line in order to make them live up to the mark, but now the intelligence of people is appealed to a little more, to develop the divinity within them rather than fear the hell they are going to face afterwards. Now the advances along theology have been carried on in a very careful way and I think advisedly so. If we spring on to the public some new idea, I don't think there is any second opinion in this section in regard to the absolute absurdity of the fumigating of rooms after communicable disease, if we get to work and have those rooms well scrubbed out and then properly gone over as far as the patient might have reached with a bi-chloride solution, we will accomplish more than by fumigation, but I think we want the moral effect of the disinfecting of a school room; it is most valuable. We have our own fixed ideas in regard to these things, but if we are changing, they will say "For Heaven's sake, what's coming next? How do we know that there is really an infection? The health officers themselves are changing their opinion every year or two." I think we have got to go carefully along these lines, according to our judgment, but do a few things for the moral effect those things will have.

Doctor Goler: I move, as an amendment to Mr. Wells' motion, "that the routine disinfection of school rooms and other places be abolished, that that is the sense of this section."

Doctor Wright: I would not like to see it go quite so far as Doctor Goler suggests; I would like to say "be condemned."

Mr. Wells: I second the amendment to the resolution doing away with it altogether.

Doctor Hastings: You have heard the amendment. Now gentlemen, I sincerely hope you will travel slowly along this way, if you don't want to place yourselves in a ridiculous position, no matter what your opinions may be, it is not always wise. Take my advice and move slowly; that is my suggestion along this line. I don't think there is any second opinion, but the time in my judgment, is not ripe for us to take such drastic action as this.

Doctor J. S. Neff: If it would not be an act of discourtesy, I would move to lay on the table, but although agreeing with many of the remarks made as to fumigation and disinfection under many conditions, at the same time this would be a very dangerous motion to put through this section. If this motion is carried, it goes to the Association through the Executive Committee to be discussed on the floor, and, I think, beaten there, and I think the majority of people in the Association, although they might be wrong, would think this is an asinine proposition coming from this section of medical men. Tuberculosis, fleas, plagues, all kinds of numerous animals, cockroaches and everything else would no longer be under the ban and we would cease disinfection and fumigation under all circumstances. I think that is dangerous—I won't say asinine.

Doctor Snow: I rise to a point of information. If this is coming to a vote, I wish to ask Doctor Goler what is his definition of disinfection? Doesn't it include fumigation?

Doctor Goler: Yes, sir.

Doctor Snow: To get rid of mosquitos?

Doctor Goler: Oh no.

A vote was then taken on Doctor Goler's amendment and it was lost.

Doctor Hastings: All in favor of the original motion, for doing away with the disinfecting of school rooms, will manifest it by the usual sign.

Mr. Wells: The motion was "The routine disinfection of school rooms after the report of every case." There might be cases in which you might desire to disinfect; we don't condemn it, but simply condemn making a routine practice to disinfect after every case, no matter whether they were taken the night after they left school or taken Sunday and had not been in school since Friday.

Doctor Hastings: I think that modification is very, very important. I didn't know there were any health departments that were in the habit of disinfecting after a single case. All in favor of condemning the routine method—now that is your motion, is it?

Mr. Wells: That motion, as I explained, was to give boards of health something to show to the Boards of Education. Now I had all I could do, as I stated, to hold our Board of Education down on firm ground, and I told them I would put this question at the meeting of this Association and I thought I would come back with a vote of 100 to 0 on my side of the case.

Doctor Levy: This is to go to the general association for their adoption, is it? Or is it just for adoption by this Section?

Mr. Wells: Just by this Section is all I care for.

Doctor Hastings: The motion, as the Secretary has it down here, is that routine disinfection of schoolrooms after a report of a case of diphtheria or scarlet fever in such rooms is regarded as unnecessary, by this Section.

The resolution was adopted.

PERMANENT SEDIMENT RECORDS FOR WATER AND SEWAGE.

George C. Whipple,
Professor of Sanitary Engineering, Harvard University and the Massachusetts Institute of Technology.

and

John W. M. Bunker,
Instructor in Sanitary Analysis, Harvard University.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

In spite of all that has been said and written on the subject of water analysis and in spite of the fact that hundreds of samples of water and sewage are being analyzed every day, it still remains true that the results of the analyses are unintelligible to a large proportion of the people who are interested in the general subject, and we might add to a great many of those who make the analyses. The interpretation of a water analysis we have been told over and over again is a matter for the expert.

Yet there are some characteristics of water that are evident to laymen and expert alike—the conspicuous physical characteristics of color and turbidity, taste and smell. Within recent years tests for these properties have been simplified and standardized, but simple as they are the results cannot be understood by one who does not know the scales of measurement. There is often needed some means of bringing to people's attention the character of a public water supply or the condition of water in a stream, or that of a sewage effluent, and this must be done by appealing to something within their every-day experience, by presenting something that they can see or smell or taste. Such a something is dirt.

Every citizen desires a supply of clean water. If the water supply is dirty it fails to give satisfaction, and any method which will exhibit its dirtiness will appeal to a universal instinct and experience. We all desire clean waterways. We believe that the final effluents from sewage treatment works should be reasonably clean—otherwise why treat the sewage—and any method which will exhibit the dirtiness of the water in a stream or in a sewer will prove a useful weapon in the fight for cleanliness which is being continually waged by sanitarians.

There are various forms of dirt found in water and sewage, if by dirt we mean substances which pollute or make foul. Some forms of dirt are in solution, or are present as colloidal substances, or as excessively fine particles. These require special tests, special methods of comparison and exhibition of results. But there is one form of evident dirt for which we have thus far had no satisfactory measure, namely, the coarser forms of suspended

matter. Our methods of turbidity do not adequately depict the presence of the larger particles of obvious dirt. These methods are largely optical and the larger particles of suspended matter do not greatly interfere with the passage of light through water unless they are quite numerous, hence they escape being recorded. A simpler method with more direct and picturesque results is needed. Such a method is the one about to be described. It is not original, being merely an adaptation of a method already in wide use for exhibiting and recording the amount of sediment in milk.

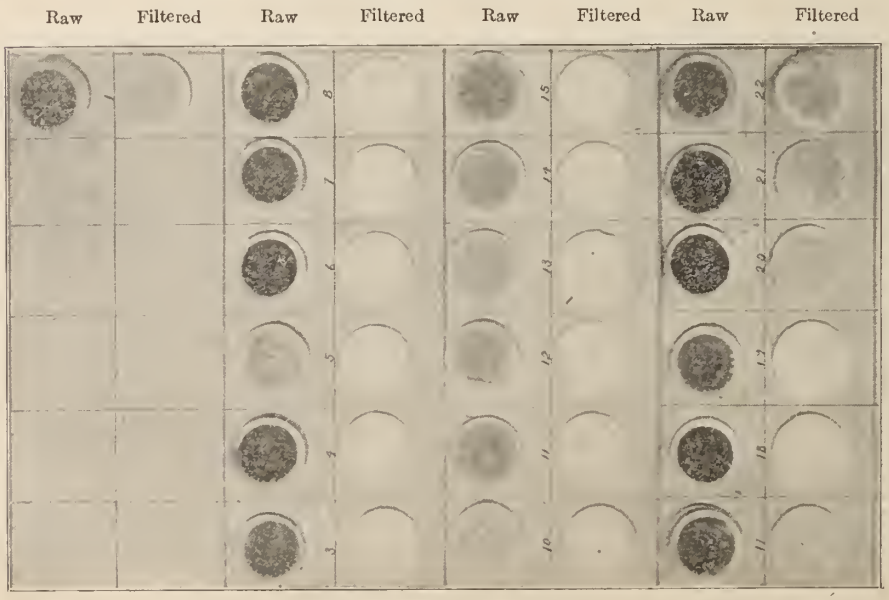
The method consists merely in straining a given volume of water, say one gallon, through a disc of absorbent cotton, about one inch in diameter, and especially prepared for the purpose. This is most conveniently done by means of a simple apparatus known as the "Wizard Sediment Tester," which is made by the Creamery Package Manufacturing Company of Albany, New York. The cotton disc, which is the filtering medium, is held between two supports of wire cloth in a cap attached to an ordinary glass milk bottle. The water to be filtered is placed in the bottle and allowed to flow out through the cotton disc. Filtration is hastened by increasing the pressure of the air within the bottle by the use of a simple air compressor operated by a hand bulb.

This particular form of apparatus is not necessary. Other similar sediment testers are on the market. Nor is it necessary to use compressed air in filtering. A gravity flow will give the same result, or a flow hastened by centrifugal force or by the water pres-

Cotton Record of Suspended Matter

Obtained by Straining One Gallon of Water from

Filter at Pierce Hall, Cambridge, Mass., Aug. 1, 1914, to Aug. 15, 1914.



COTTON RECORD OF SUSPENDED MATTER
Obtained by Straining 200 cc. of Sewage from
Sewage Disposal Plant from Worcester, Mass., Sept. 30, 1914.



sure of the city mains. All of these methods have been used in the laboratory of sanitary engineering at Harvard University.

The coarse sediment in the water is retained in the pores of the cotton disc and remains as a permanent record which readily appeals to the eye and which by its appearance gives at once a good idea of the quantity and character of the substances present. For permanent record it is well to provide sheets or cards to which the cotton discs may be easily attached after drying by using a drop of mucilage or a "stamp sticker." The suspended matter does not change in appearance even after a long time, and does not shake off unless too much sediment is allowed to collect. For the sake of uniformity the writers suggest that the following table be accepted as a tentative standard for quantities of water to be filtered:

STANDARD QUANTITIES FOR FILTRATION THROUGH COTTON DISCS.

Filtered water	1 gallon.
Ground water	1 gallon.
"Clean" surface water	1 quart.
"Dirty" surface water	1 pint.
Sewage and sewage effluents	$\frac{1}{2}$ pint.

While the metric units of measurement are more scientific than the commonly used units of liquid measure, the latter are better comprehended by the public and are more appropriate for this crude test.

The quantity to be filtered varies with different waters. It is advisable to filter the smallest quantity that will give a definite record, inasmuch as increased quantities tend to pile up the

sediment on top of the first layer and therefore do not show small variations. A water rich in algæ will produce a definite stain on a cotton disc after one quart has passed through. A clean water does not leave any noticeable discoloration when this amount is filtered but may color the disc slightly when a larger sample is taken for the test. A typical crude sewage, on the other hand, will clog the disc when from 150 to 200 cubic centimeters have been strained, and more can be forced through only with great difficulty. The best sewage effluent will give some discoloration when this quantity has been filtered, so that a ready comparison is possible.

Samples of the sediment found in the tap water of Cambridge, Mass., have been taken almost every day for more than a year. The cotton discs record the changes in the growths of algæ with striking picturesqueness. In summer when the cholorophyceæ are abundant the stain on the cotton disc has a bright green color. During the ascendency of the cyanophyceæ, in the "dog days," the color is a slaty bluish green. The quantity of sediment fluctuates somewhat from day to day as the wind blows the algæ from one side of the reservoir to the other and as the algæ rise or fall in the water. In the spring the sediment has a brownish color due to the presence of diatoms. Samples of water collected at different depths show very distinctly the distribution of the algæ in a vertical direction from top to bottom. Normally the algæ are most abundant at the surface but decrease with greater depths. The samples at the bottom often show the presence of a brown-colored sediment due to the influence of the organic matter and iron found in the stagnant layers.

Any departure from the normal distribution is quickly noted by this method of examination, as is shown by a set of discs made at Lake Cochituate on October 2, 1914. This series shows a steady decrease in depth of color down to the transition zone at which point there is a darkening of the discs, due no doubt to a concentration of organisms at this point. Immediately below this, the organisms fall off, and again increase gradually until the forty-five foot level is reached. The last fifteen feet, from the forty-five foot depth to the bottom, show the presence of a different kind of sediment, darker in color and more abundant in quantity in which iron is present in large amounts.

On some days the amount of sediment in the Cambridge water has been found to suddenly increase owing to the disturbance of deposits in the pipes. The character of this sediment is quite different from that normally found. Again samples taken from the hot and cold water taps often show marked differences, the hot water sediments showing the presence of iron rust derived from the action of the water on the heater or the piping in the houses.

The method is particularly well adapted to show the effect of filtration on dirty water. During the past year an experimental mechanical filter has been in operation at the Laboratory of Sanitary Engineering, Harvard University, and daily records have been

kept of the sediment in the water before and after filtration. The results are often more striking than the figures which show the removal of bacteria. On certain days when the filter was not operating at its best the cotton discs through which the filtered water passed were slightly discolored.

Mr. Clifton L. Rice, who has been recently assisting Mr. Frank A. Barbour in a series of valuable experiments on the purification of the water at Lowell, Mass., has used the cotton disc method with marked success. Mr. Barbour's report shows photographs of the sediment collected on the cotton discs. The problem there is the removal of iron and manganese from the water. The efficiency of the purification processes which it is proposed to employ is well indicated by the stains made by the raw water and the absence of stain when treated water is passed through the cotton.

Professor Robert Spurr Weston recently exhibited to the New England Water Works Association some series of samples showing the removal of iron and manganese from other water supplies of Massachusetts by filtration.

The cotton disc sediment record has the following advantages:

1. It can be made very easily and quickly.

2. It can be made by the laborer and the office boy as well as by the engineer or chemist.

3. It is inexpensive.

4. The records are picturesque and easily understood by every one.

5. Within limits the records are quantitative as well as qualitative. They serve well for comparing samples from the same place on different dates.

6. The records are permanent.

7. The records may be conveniently mounted for preservation.

8. The records may be photographed.

9. A relatively large volume of water is tested.

10. It is a valuable supplement to the regular water analysis.

A STATISTICAL STUDY OF WHOOPING COUGH.

FREDERICK S. CRUM, PH. D.,
Assistant Statistician, The Prudential Insurance Company of America.

Read before the Vital Statistics Section of the American Public Health Association, Jacksonville, Fla., December 4, 1914.

THE first well-attested account of a whooping cough epidemic is that by Baillou, of Paris, who in 1578 wrote of a prevalent convulsive cough and remarked that the malady had not previously been described. In England it was not until 1701 that "Whooping cough and chincough" became a separate entry in the London bills of mortality. In that year six deaths were recorded under the dual title. During the first half of the eighteenth century 2,787 deaths were recorded as whooping cough in London and in the second half of that century the aggregate of the deaths reported under this title in London was 15,045.

It was in Sweden, however, that whooping cough seems first to have been assigned its rightful place in the nomenclature of diseases. During the period 1749 to 1764 no fewer than 42,393 deaths were recorded under this title in that country, an annual average of 2,600 deaths, and in 1755, an epidemic year, the whooping cough deaths numbered 5,832.

An international survey of the statistics of whooping cough reveals the fact that the mortality is world-wide in its geographical distribution. No climate, country or race seems to be immune to this disease, although its extent and fatality vary greatly in the different countries, and are apparently affected by the varying circumstances of age, sex, season, climate, altitude, etc.

WHOOPING COUGH MORTALITY IS WORLD-WIDE.

Combining the statistics of twenty-four countries for a recent five-year period it was found that 1 per cent. of the grand total of deaths from all causes was due to whooping cough. The average annual death-rate from whooping cough for these countries was 8.0 per 100,000 of total population. These statements are based upon an aggregate population of 1,908,270,-362 exposed to death one year, a total mortality from all causes of 35,586,933 and an aggregate of 344,439 deaths from whooping cough. The countries represented include such widely separated areas as Japan, England, Chili and the United States. The death-rates from whooping cough varied in these countries from 66.5 per 100,000 of population in Chili to 1.9 in Ceylon. In the registration area of the United States the average annual death-rate was only 10.4 during the five-year period, 1908 to 1912, as compared with 23.8 for Prussia, 23.5 for England and Wales, 17.3 for Italy, and 8.2 for France. In Japan the average death-rate from this cause was 7.4 per 100,000 of population during 1906 to 1910.

The percentage of the total mortality chargeable to whooping cough varied considerably in the countries for which

the data were available, or from 0.1 per cent. in Ceylon, 0.4 per cent. in France and Japan, 0.6 per cent. in New Zealand and 0.7 per cent. in the United States, Australia, Denmark and Spain, to 2.7 per cent. in Scotland, 2.2 per cent. in Chili, 2.0 per cent. in Belgium and 1.7 per cent. in England and Wales. Of the twenty-four countries for which the data were compiled, eleven showed percentages under 1.0 and thirteen percentages of 1.0 or more.

Climate and Whooping Cough.

Some writers profess to find a relation between whooping cough mortality and climate, but all admit that there are many exceptions. Both Hirsch and Clemow state that the epidemic extensiveness and the severity of type of whooping cough increase, generally speaking, according as it is found in the tropical, subtropical, temperate and cold zones. In Iceland, however, this disease has always been infrequent while in Jamaica the average annual death-rate during 1908 to 1912 was higher than in Norway, Sweden, Switzerland or Denmark. Many other exceptions to the general rule could be cited but these are sufficient to indicate that climate is probably an etiological factor of only secondary importance either in the spread of whooping cough or in the determining of its type. Severity of climate or season undoubtedly is an influencing factor, other things equal, and this is readily explainable when we recall that the great majority of whooping cough fatalities are the result of complications or sequelæ and further that fully 60 per cent. of the fatal complications are of a respiratory character.

In this connection attention may be directed to the exceptional prevalence and fatality of whooping cough in La Paz, Bolivia. This city had a population of 78,856 in 1909. It is at an altitude of 11,910 feet and in latitude 16 degrees 30 minutes, south. Over a period of several years its annual rainfall averaged only $2\frac{1}{8}$ inches and it had a fairly constant average annual temperature of 48.7 degrees Fahrenheit. During the nine and one-half year period, January, 1900, to July 31, 1909, the actual number of deaths from whooping cough in La Paz was 3,468, or equivalent to an average annual death-rate of 54.6 per 10,000 of population. Whooping cough was the most important single cause of death during this period and it constituted 14.8 per cent. of the total mortality. During the nine and one-half years whooping cough was apparently endemic in La Paz and the annual range in the actual number of deaths was from 252 in 1906 to 444 in 1904. In 1909, however, the mortality from whooping cough was above the average for there were 425 deaths recorded in the first six months of the year. No data are available subsequent to July 31, 1909.

The distinctive facts which may largely account for the excessive fatality of whooping cough in La Paz are the extreme altitude, light rainfall and cool temperature. There may, however, be other determining factors, for in Leadville, Col., which is at an altitude of 10,200 feet, with an average annual rainfall of 18 inches and with

an average temperature of 34.5 degrees annual Fahrenheit, the average annual mortality-rate from whooping cough during 1900 to 1909 was only 3.13 per 10,000 of population, as against 54.6 for La Paz. In Leadville, during the decade, whooping cough constituted only 1.4 per cent. of the total mortality, against 14.8 per cent. in La Paz. In Leadville, however, the rainfall is considerably heavier than in La Paz and the temperature is much more variable.

The mortality from whooping cough is so exceptional in La Paz that the following table is presented as a distinct contribution to the statistical literature of the subject:

MORTALITY FROM WHOOPING COUGH IN THE CITY OF LA PAZ, BOLIVIA, 1900–1909.

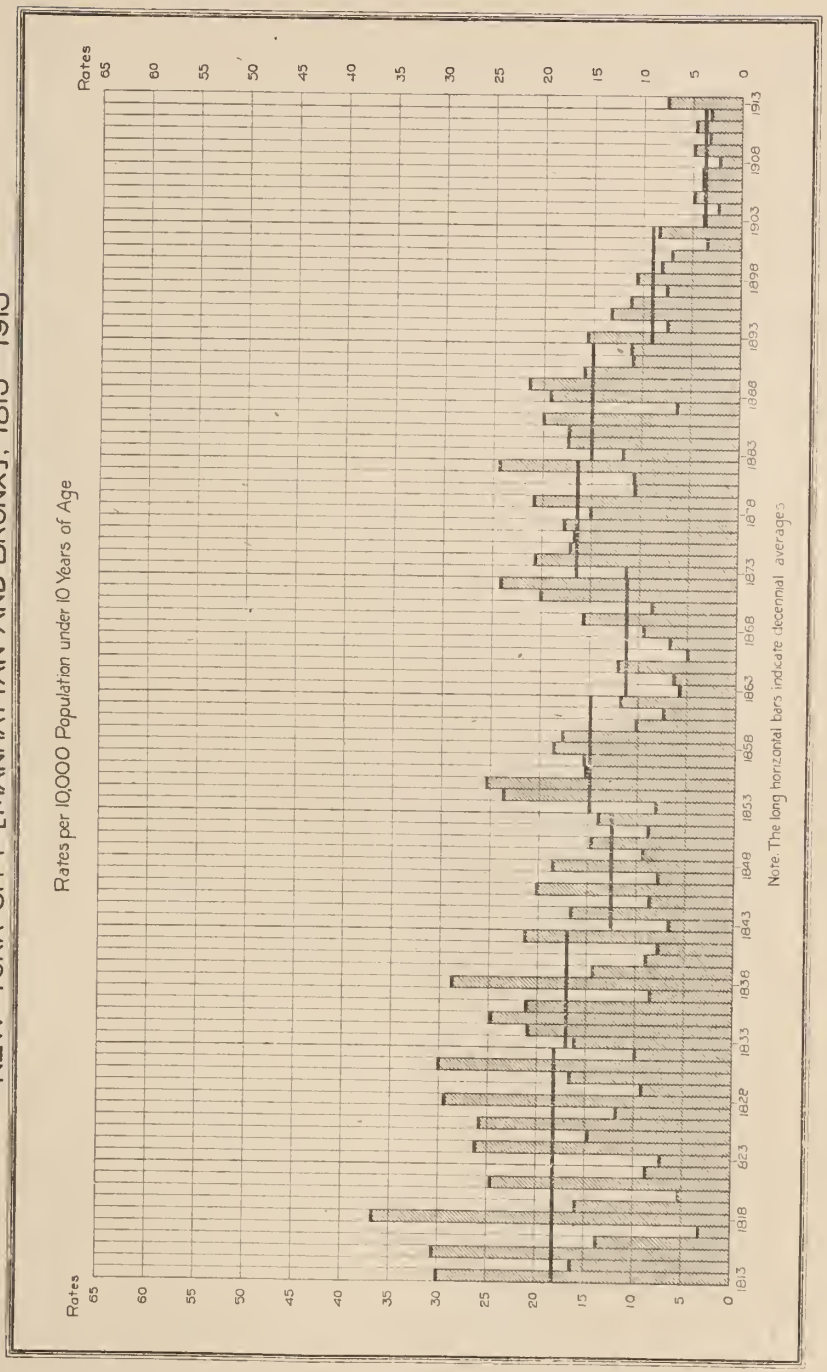
Years.	Population.	Deaths from whooping cough.	Rates per 100,000 population.
1900.....	59,633	368	617.1
1901.....	59,832	360	601.7
1902.....	60,031	318	529.7
1903.....	62,720	348	554.8
1904.....	65,410	444	678.8
1905.....	68,100	339	497.8
1906.....	70,789	252	356.0
1907.....	73,478	308	419.2
1908.....	76,167	306	401.7
1909.....	39,428*	425*	1,077.9
1900-09 ...	635,588	3,468	545.6

*Only for 6 months, January 1 to July 31. Source: Censo Municipal de la Ciudad de La Paz, 15 de Junio de 1909.

As whooping cough, even more than measles, is a disease of infancy and early childhood it is not surprising to find that its epidemics in any given locality are usually of frequent occurrence. This is clearly seen in the chart on page 997, showing the mortality from this cause in New York City (Manhattan and Bronx Boroughs) during a century and also in the chart showing the comparative mortality from whooping cough in fifteen representative American cities during the period 1900 to 1913. As a rule whooping cough in any given locality recurs in more or less epidemic form at intervals of one or two years.

Race and Whooping Cough.

The conclusion of Hirsch that "differences of *race* and *nationality*" do not "create a predisposition to or immunity from whooping cough" is even more easily verifiable today than when he wrote in 1881. That the American Indian is as liable to attack by this disease as the Caucasian is quite evident from a reading of the reports of the agency physicians of the United States and Canada who have reported numerous epidemics, many of them quite fatal in character. In the United States, during the period 1888 to 1893, in an aggregate Indian agency and Indian school population of 857,089, there were 4,003 cases of whooping cough reported by the agency physicians. This was equivalent to an attack-rate of 46.7 per 10,000 of population. The corresponding death-rate among these Indians was 18.5 per 100,000 of population. These facts are sufficient proof that the American Indian is quite as susceptible to whooping cough as the Caucasian.


MORTALITY FROM WHOOPING COUGH, ALL AGES
NEW YORK CITY [MANHATTAN AND BRONX], 1813–1913
Rates per 10,000 Population under 10 Years of Age
Rates
65
60
55
50
45
40
35
30
25
20
15
10
5
0
1813
1818
1823
1828
1833
1838
1843
1848
1853
1858
1863
1868
1873
1878
1883
1888
1893
1898
1903
1908
1913
Note: The long horizontal bars indicate decennial averages

The evidence that the negro is highly susceptible to whooping cough is even more positive than that just presented for the Indian. In Washington, D. C., the cases and deaths have been reported with distinction of color and age since April 9, 1907 and the statistics for the five-year period, 1908 to 1912, show that the attack-rate was higher for the colored than for the white population at ages under one year and also at ages one to four years. In other words the attack-rate was higher among the colored than among the white population at the period of life when whooping cough is most contagious and most fatal. In Washington, during this five-year period, 66.7 per cent. of all the reported colored cases were of ages under five years and 54.0 per cent. of the white cases were of that age period. It is quite probable that the white cases are more completely reported than are the colored cases and if this assumption is true the excess in the colored attack-rate is even higher than the statistics show. That the colored cases of whooping cough are not so completely reported as the white finds some proof in the fact that the case-mortality of the colored patients was 12.06 per cent. as against only 2.37 per cent. for the white. The case data as reported in Washington have been compiled and are presented in Table I.

In Table II the mortality from whooping cough, with distinction of color and age, is presented for five representative southern cities.

These statistics seem to prove that, beyond any question of reasonable doubt, the negro has a much higher mortality from whooping cough than the Caucasian. At ages under one year the average negro death-rate was nearly three times as high as the white death-rate. At ages one to four years the average negro death-rate was nearly five times as high as the white death-rate. Whether or not any part of this excess is to be attributed to

TABLE I.

ATTACK-RATE FROM WHOOPING COUGH BY COLOR AND AGE, WASHINGTON, D. C., 1908–1912.

(Rate per 10,000 of Population.)

Age.	White.			Colored.		
	Population.	Cases.	Rate.	Population.	Cases.	Rate.
Under 1 year	20,125	295	146.6	7,290	191	262.0
1–4 years	76,680	1,210	157.8	29,160	517	177.3
5–9 years	90,545	1,063	117.4	35,960	302	84.0
10–19 years	184,410	130	7.0	79,155	38	4.8
20 years and over	805,085	87	1.1	320,665	13	0.4
All Ages	1,180,640	2,785	23.6	472,230	1,061	22.5

TABLE II.

MORTALITY FROM WHOOPING COUGH IN FIVE SOUTHERN CITIES BY COLOR AND AGE, 1908–1912.*

(Rates per 100,000 of Population of Specified Ages.)

Ages under 1 Year.

Cities.	White.			Colored.		
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.....	44,455	109	245.2	6,730	61	906.4
Louisville, Ky.....	16,220	46	283.6	2,550	19	745.1
Memphis, Tenn.....	7,330	15	204.6	3,840	19	494.8
New Orleans, La....	26,175	54	206.3	8,060	23	285.4
Washington, D. C...	20,125	37	183.9	7,290	59	809.3
Total	114,305	261	228.3	28,470	181	635.8

Ages 1 to 4.

	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.....	182,325	70	38.4	26,410	79	299.1
Louisville, Ky.....	65,730	27	41.1	9,740	29	297.7
Memphis, Tenn.....	27,790	5	18.0	14,805	20	135.1
New Orleans, La.....	95,890	53	55.3	30,060	26	86.5
Washington, D. C...	76,680	23	30.0	29,160	61	209.2
Total	448,415	178	39.7	110,175	215	195.1

Ages 5 to 9.

	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.....	215,995	6	2.8	32,080	10	31.2
Louisville, Ky.....	78,750	4	5.1	12,600	4	31.7
Memphis, Tenn.....	31,530	1	3.2	18,680	3	16.1
New Orleans, La.....	120,995	2	1.7	39,120	2	5.1
Washington, D. C...	90,545	3	3.3	35,960	4	11.1
Total	537,815	16	3.0	138,440	23	16.6

* These statistics are from the annual mortality reports of the Bureau of the United States Census.

TABLE II — CONTINUED.

AGES 10 AND OVER.

Cities.	White.			Colored.		
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.....	1,921,755	1	0.1	357,455	1	0.3
Louisville, Ky.....	755,640	—	—	176,785	—	—
Memphis, Tenn.....	323,325	—	—	224,110	—	—
New Orleans, La.....	995,460	—	—	367,780	—	—
Washington, D. C....	989,495	2	0.2	397,455	—	—
Total	4,985,675	3	0.1	1,523,585	1	0.1

ALL AGES.

	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.....	2,366,935	186	7.9	423,745	151	35.6
Louisville, Ky.....	916,950	77	8.4	202,610	52	25.7
Memphis, Tenn.....	392,950	21	5.3	264,205	42	15.9
New Orleans, La.....	1,247,015	109	8.7	446,310	51	11.4
Washington, D. C....	1,180,640	65	5.5	472,230	124	26.3
Total	6,104,490	458	7.5	1,809,100	420	23.2

anatomical differences in the two races is beyond the scope of this paper to discuss. A careful study of the whole question would doubtless lead to important conclusions. It is of interest to note in this connection that the excessive mortality of negroes from whooping cough is not a phenomenon of recent years. In Charleston, S. C., during the period 1822 to 1848, the average annual death-rate of the colored population was 650.5 per 100,000, against a death-rate of 305.8 for the white population. The negro mortality from whooping cough in Charleston in this early period is thus shown to have been more than twice that of the white population.*

That Filipinos are susceptible to whooping cough is proved by the fact that the official reports of Manila record 60 deaths from that cause among Filipinos in that city during the decade 1904 to 1913. During the four years, 1908 to 1911, there were 6,644 deaths from whooping cough reported in the Philippine Islands, equivalent to an average annual death-rate of 30.0 per 100,000 of total population. In the Province of Negros Orientale there were 233 deaths from whooping cough reported during 1911,

*See Census of the City of Charleston, 1848, pages 237 and 245.

equivalent to a death-rate of 126.0 per 100,000 of population. In Bohol Province the death-rate was 100.0 in 1911; in Capiz, 99.1; in Iloilo, 86.3; and in Cebu Province, 64.1. The foregoing facts go far to establish the conclusion that all races of men are susceptible to whooping cough, but I may add that in Japan, during the five-year period, 1906 to 1910, no fewer than 18,414 deaths from this cause were officially reported, equivalent to an average annual death-rate of 7.4 per 100,000 of total population.

Sex and Whooping Cough.

The mortality from whooping cough is decidedly higher among female than among male children, and this excess is pronounced at all ages for which the numbers are sufficiently large to be conclusive. In Table III the mortality from whooping cough, with distinction of sex, is presented for the registration area of the United States, for the period 1900 to 1912.

The female mortality was higher than the male in every year of the period. The average excess for the six-year period, 1900 to 1905, was 24.2 per cent. and for the period 1906 to 1912, the female excess was practically the same, or 24.5 per cent.

That the mortality from whooping cough is higher among females than among males at all ages is proved by all the available data. In Massa-

TABLE III.

MORTALITY FROM WHOOPING COUGH, WITH DISTINCTION OF SEX, REGISTRATION AREA, UNITED STATES, 1900–1912.

(Rates per 100,000 of Population, all Ages.)

Years.	Males.			Females.		
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
1900	15,415,757	1,691	11.0	15,378,516	2,028	13.2
1901	15,742,434	1,344	8.5	15,628,518	1,707	10.9
1902	16,111,848	1,707	10.6	15,917,967	2,147	13.5
1903	16,489,113	2,374	14.4	16,211,970	2,797	17.3
1904	16,856,270	967	5.7	16,492,867	1,216	7.4
1905	17,274,352	1,624	9.4	16,820,253	1,975	11.7
1906	21,322,133	2,824	13.2	20,661,286	3,500	16.9
1907	21,899,144	2,273	10.4	21,117,846	2,583	12.2
1908	23,876,529	2,243	9.4	22,913,384	2,726	11.9
1909	26,020,431	2,264	8.7	24,850,087	2,642	10.6
1910	27,606,526	2,769	10.0	26,237,370	3,377	12.9
1911	30,463,411	3,112	10.2	28,812,566	3,570	12.4
1912	31,128,193	2,531	8.1	29,298,940	3,088	10.5
1900–05	97,889,774	9,707	9.9	96,450,091	11,870	12.3
1906–11	151,188,174	15,485	10.2	144,592,539	18,398	12.7

TABLE IV.

MORTALITY FROM WHOOPING COUGH IN MASSACHUSETTS, 1909–1911, WITH DISTINCTION OF SEX AND AGE.

(Rates per 100,000 Population of Specified Ages.)

Ages at Death.	Males.			Females.			Percentage excess of female over male rate.
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.	
Under 1 year.....	107,439	219	203.8	104,763	252	240.5	18.0
1 year.....	94,689	72	76.0	91,815	81	88.2	16.1
2 years.....	102,210	16	15.7	100,485	32	31.8	102.5
3 years.....	100,371	7	7.0	99,054	8	8.1	15.7
4 years.....	93,516	7	7.5	92,316	13	14.1	88.0
Under 5 years....	498,225	321	64.4	488,433	386	79.0	22.7
5 years and over..	4,461,174	5	0.1	4,641,111	13	0.3	200.0
Total.....	4,959,399	326	6.6	5,129,544	399	7.8	18.2

chusetts the detail figures are presented for a three-year period, 1909 to 1911, in Table IV.

These statistics show that in Massachusetts the female mortality from whooping cough is substantially in excess of the male mortality from that cause, and at all ages.

In England and Wales where the mortality from whooping cough is

TABLE V.

MORTALITY FROM WHOOPING COUGH IN ENGLAND AND WALES, 1910–1912, WITH DISTINCTION OF SEX AND AGE.

(Rates per 100,000 of Population of Specified Ages.)

Age.	Males.			Females.			Percentage excess of female over male rates.
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.	
Under 1 year.....	1,185,330	5,492	463.3	1,159,854	6,417	553.3	19.4
1 year.....	1,122,327	3,241	288.8	1,106,127	4,282	387.1	34.0
2 years.....	1,187,757	1,077	90.7	1,180,128	1,600	135.6	49.5
3 years.....	1,166,007	582	49.9	1,166,046	791	67.8	35.9
4 years.....	1,146,918	299	26.1	1,142,655	467	40.9	56.7
Under 5 years....	5,808,339	10,691	184.1	5,754,810	13,557	235.6	28.0
5 years and over..	46,528,485	312	0.7	50,119,842	488	1.0	42.9
Total.....	52,336,824	11,003	21.0	55,874,652	14,045	25.1	19.5

considerably higher than in this country the same sex difference is observable. In Table V the statistics are presented for the three-year period, 1910 to 1912.

In Bavaria the mortality from whooping cough is higher than in England and the same excess of female over male mortality has been noted there. The following data are, therefore, interesting as confirming the American and English experience:

MORTALITY FROM WHOOPING COUGH IN BAVARIA BY AGE AND SEX, 1893–1902.*

(Rates per 100,000 Population.)

Ages.	Males.	Females.	Percentage excess of female over male rates.
Under 1 year	674.0	771.0	14.4
1 year.....	295.0	394.0	33.6
2–4 years....	38.0	60.0	57.9
5–9 years....	3.9	6.4	64.1
10–14 years..	0.2	0.3	50.0

* From article by Prof. E. Feer in Medizinische Klinik, Berlin, May, 1914.

The foregoing statistics confirm the following statement made by Creighton in his "History of Epidemics in Britain": "No other epidemic malady has shown the same excess of female deaths in proportion to the numbers of the sex living." He adds the following significant statement as a possible explanation of this sex difference: "The singular difference between the sexes in this respect is almost certainly related to the corresponding differences in the formation and development of the larynx, the organ which gives character, at least, to the convulsive cough of children. The expansion of the larynx in boys, which becomes so obvious at puberty and remains so distinctive of the male sex, is one of those secondary sexual characters which begin to differentiate quite early in life, and are probably congenital to some extent. It is not known whether female children are more often attacked than males; but it is probable that they are predisposed both to acquire coughs of the convulsive, suffocative kind and to have their lives shattered by the attack—for the same anatomical and physiological reasons, namely, the imperfect development of the posterior space of the glottis with the spasmodic closure by reflex action."

Age and Whooping Cough.

In three of the foregoing tables illustrating the sex differences in whooping cough mortality the relative death-rates at various ages are also indicated. In Massachusetts the death-rate for both sexes in the first year of life was far higher than at any subsequent age. The death-rate for both sexes in Massachusetts in the first year of life was more than two and one-half times the rate in the second year of life, or for males, 203.8 in the first year of life, against 76.0 in the second, and for females, 240.5 in the first year of life, against 88.2 in the second. The great majority of the deaths of both sexes occurred in the first three years of life, not more than 2 or 3 per cent. of the total mortality occurring at ages five years and over. In England and Wales the death-rate

is also considerably higher in the first year of life than in the second, and this is true of both sexes. The death-rate rapidly diminishes after age two and is almost negligible at the adult ages. In England, as in Massachusetts, less than 5 per cent. of all the deaths from whooping cough occur at ages five years and over.

The mortality from whooping cough in the registration area of the United States is available in considerable detail for ages under five years for the three-year period, 1910 to 1912. A summary of the facts, together with a comparison with the mortality from measles, is presented in the following table:

TABLE VI.

COMPARATIVE MORTALITY FROM WHOOPING COUGH AND MEASLES, BY AGE AT DEATH, REGISTRATION AREA, UNITED STATES, 1910–1912.

Ages at Death.	Whooping Cough.		Measles.	
	Number of deaths.	Distribution on basis of 1,000 deaths, all ages.	Number of deaths.	Distribution on basis of 1,000 deaths; all ages.
Less than 1 day	1	0.1	14	0.9
1 day	4	0.2	5	0.3
2 days	3	0.2	2	0.1
3 to 6 days	21	1.1	15	0.9
Less than 1 week	29	1.6	36	2.2
1 week	54	2.9	55	3.3
2 weeks	239	13.0	69	4.1
3 weeks but less than 1 month	403	21.8	52	3.1
Less than 1 month	725	39.3	212	12.7
1 month	1,441	78.2	153	9.1
2 months	1,249	67.7	131	7.8
3 to 5 months	2,516	136.5	502	30.0
6 to 8 months	2,310	125.3	1,221	72.9
9 to 11 months	1,992	108.0	1,710	102.0
Under 1 year	10,233	555.0	3,929	234.5
1 year	4,313	233.9	5,303	316.5
2 years	1,736	94.2	2,410	143.8
3 years	840	45.6	1,171	69.9
4 years	465	25.2	696	41.5
5 to 9 years	673	36.5	1,418	84.7
10 to 19 years	89	4.8	687	41.0
20 years and over	89	4.8	1,141	68.1
Total, known ages	18,438	1,000.0	16,755	1,000.0

This comparison brings out some interesting facts. For illustration, it is shown that whooping cough is even more fatal at the very young ages than is measles. In the whooping cough mortality 39.3 deaths in every 1,000 were at ages under one month as against 12.6 deaths at the same ages among every 1,000 deaths from measles; for ages under three months the relative proportions in every 1,000 deaths, all ages, were for whooping cough 185.1, as against 29.5 for measles. Similarly, in the mortality from whooping cough, 554.7 out of every 1,000 deaths were under one year of age, against 234.4 for measles; and at ages under five the relative proportions were 953.4 for whooping cough as against 806.0 for measles. In other words, on the basis of the mortality in the registration area of the United States, 95.3 per cent. of all the deaths from whooping cough occurred at ages under five years, as against 80.6 per cent. for measles. These facts quite clearly indicate that whooping cough and its complications are even more fatal at the very early ages than are measles and its complications.

Whooping Cough and the Mortality from all Causes.

The proportion of the total mortality which is chargeable to whooping cough varies considerably with age, as the following tables show:

PROPORTIONATE MORTALITY FROM WHOOPING COUGH, REGISTRATION AREA, UNITED STATES, 1910–1912.

Age.	Deaths from		Percentage of the total mortality due to whooping cough.
	All causes.	Whooping cough.	
Under 6 mos. . .	346,671	5,931	1.71
6 to 11 mos. . . .	104,479	4,302	4.12
Under 1 year . . .	451,150	10,233	2.27
1 year	94,155	4,313	4.58
2 years	41,496	1,736	4.18
3 years	25,976	840	3.23
4 years	18,663	465	2.49
Under 5 years . .	631,440	17,587	2.79
5–9 years	53,329	673	1.26
10 yrs. and over	1,794,971	178	0.01
Ages unknown .	3,207	9	—
All ages	2,482,947	18,447	0.74

PROPORTIONATE MORTALITY FROM WHOOPING COUGH, ENGLAND AND WALES, 1910–1912.

Age.	Deaths from		Percentage of the total mortality due to whooping cough.
	All causes.	Whooping cough.	
Under 6 mos. . .	211,831	5,477	2.59
6 to 11 mos. . . .	80,127	6,432	8.03
Under 1 year . . .	291,958	11,909	4.08
1 year	79,865	7,523	9.42
2 years	31,514	2,677	8.49
3 years	19,026	1,373	7.22
4 years	13,627	766	5.62
Under 5 years . .	435,990	24,248	5.56
5–9 years	35,370	750	2.12
10 yrs. and over	1,026,636	50	0.005
All ages	1,497,996	25,048	1.67

These tables, based upon large numbers, indieate quite clearly that whooping eough, relatively to the total mortality from all causes, is most important in the seeond year of life. It is also an important factor in the total mortality in the second half of the first year of life, or at ages 6 to 11 months, inelusive. After age five the deaths from whooping eough form an ever-decreasing pereentage of the total mortality, and at ages over ten they are an almost negligible faetor. These faets are brought out in a graphic manner in the chart on page 1007, showing the mortality from whooping cough in the Registration Area of the United States.

Case Mortality in Relation to Age and Sex.

Exaet knowledge of the average comparative fatality of whooping eough eases, with distinetion of age and sex, is not available from statisties compiled in this eountry. The most extensive data in this connection seem to be those for Aberdeen, Seotland, and these are available in the exeellent report by James S. Laing, M. D., D. P. H., and Prof. Matthew Hay, M. D., entitled *Whooping Cough: Its Prevalence and Mortality in Aberdeen*, which was published in 1902. The statisties for Aberdeen were as follows:

TABLE VII.

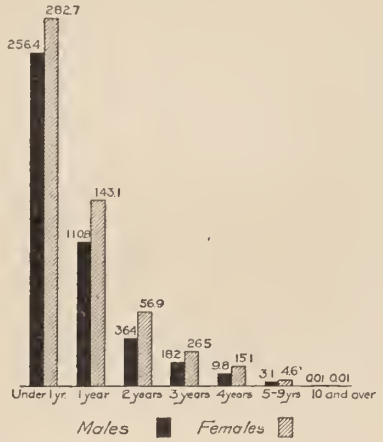
CASE-MORTALITY FROM WHOOPING COUGH IN ABERDEEN, SCOTLAND, WITH DISTINCTION OF AGE AND SEX, 1891–1900.

Age.	Males.			Females.		
	Cases.	Deaths.	Deaths in every 100 cases.	Cases.	Deaths.	Deaths in every 100 cases.
Under 3 mos.	177	20	11.3	163	32	19.6
3–5 mos.	359	47	12.4	346	43	13.0
6–8 mos.	396	40	10.1	407	48	11.8
9–11 mos.	324	48	14.8	320	25	7.8
Under 1 year	1,256	165	13.1	1,236	148	11.9
1 year	1,114	107	9.6	1,213	128	10.5
2 years	1,128	35	3.1	1,169	41	3.5
3 years	1,010	23	2.2	1,119	25	2.2
4 years	847	15	1.7	961	15	1.5
5 years	836	3	0.3	840	6	0.7
6 years	561	—	—	602	8	1.3
7 years	288	—	—	296	1	0.3
8 years	105	—	—	161	1	0.6
9 years	54	—	—	60	—	—
10 years and over	79	—	—	158	1	0.6
All ages	7,278	348	4.7	7,815	374	4.7

MORTALITY FROM WHOOPING COUGH
UNITED STATES REGISTRATION AREA

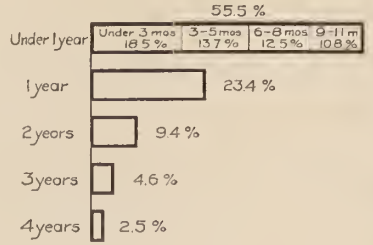
Mortality by Age and Sex
1908-1912

Rates per 100,000 population of specified ages



Age Distribution of Deaths
1910-1912

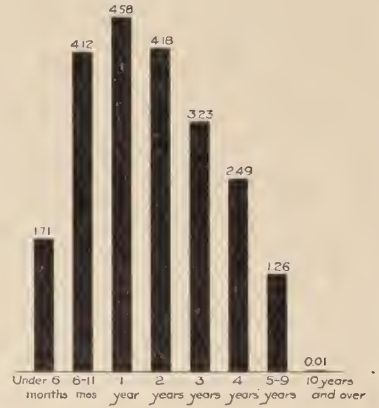
Percentage distribution of deaths from whooping cough



Only 4.6 percent of all deaths from whooping cough occurred at ages 5 years and over.

Percentage of Total Mortality
1910-1912

Deaths from whooping cough per 100 deaths from all causes



These statistics seem to indicate that the higher mortality of the female sex is due to the greater number of cases, rather than to the more fatal character of the disease among females. In Aberdeen the case mortality was practically the same for both sexes when due regard is had to the smallness of the numbers at the ages where variations were considerable. When all ages are combined the case-mortality ratio was the same for both sexes, or 4.7 per cent. The Aberdeen statistics show whooping cough cases to be most fatal in the first year of life and the ratio of fatal to total cases is high also in the first three months of life, being quite exceptionally so for females, or 19.6 per cent. These Aberdeen data are a valuable contribution to the statistics of whooping cough, but they require to be supplemented with similar data for other cities before many final conclusions can be deduced as to case-mortality in whooping cough.

Urban vs. Rural Mortality from Whooping Cough.

The urban death-rates from whooping cough do not appear to compare so unfavorably with the rural death-rates as is true in the mortality from measles. Table VIII, based upon statistics of Registration States, seems to indicate that the death-rate at the present time is appreciably higher in the rural than in the urban area.

Decline in the Mortality from Whooping Cough.

It is a fact well known to medical practitioners and sanitarians that whooping cough, like measles, is a disease the spread of which is exceedingly difficult to control because it is highly contagious at a stage when its certain diagnosis is almost if not quite impossible. The fatality of whooping cough is, however, largely subject to control through the proper care and treatment of the patients. That there has been a general improvement in this respect

TABLE VIII.

MORTALITY FROM WHOOPING COUGH IN RURAL AND URBAN AREAS, REGISTRATION STATES, UNITED STATES, 1900–1912.

Years.	Rural.			Urban.		
	Population.	Deaths.	Rates per 100,000 population.	Population.	Deaths.	Rates per 100,000 population.
1900–1905	55,487,515	4,908	8.8	69,498,082	8,045	11.6
1906–1911	120,535,968	14,318	11.9	133,089,503	15,249	11.5
1900–1911	176,023,483	19,226	10.9	202,587,585	23,294	11.5
1912	27,102,779	2,831	10.4	27,694,590	2,288	8.3

is apparent when we review the world statistics of the mortality from this disease. In seventeen countries where a comparison of the mortality was possible between five-year periods, separated by an interval of twenty years, no fewer than fourteen of the countries showed decreases in the mortality-rates from whooping cough and only three, Jamaica, Norway and the Province of Ontario, Can., showed higher rates in the recent than in the earlier five-year period. A summary of this comparison is presented in Table IX.

A world-wide comparison of the mortality from whooping cough during 1883 to 1887 and during the last five-year period available discloses the fact that within the last quarter of a century there has been a reduction in the average death-rate from 52.4 per 100,000 of population to 23.8, which represents an actual decrease of 28.6 in the rate, equivalent to 54.6 per cent.

For the state of Massachusetts it is possible to compare the mortality from whooping cough by decades for a half-century with distinction of sex. This comparison is limited to population and deaths of ages under five years, for fully 95 per cent. of the total mortality is at this early age.

The data in Table X indicate that

TABLE IX.

COMPARATIVE MORTALITY FROM WHOOPING COUGH IN SEVENTEEN COUNTRIES.

Country.	1883–1887.			1908–1912.			Increase or decrease in rate.
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.	
Australia	13,327,248	2,351	17.6	21,974,430	1,574	7.2	−10.4
Austria	114,323,956	119,206	104.3	142,091,028	47,036	33.1	−71.2
Belgium	29,243,761	19,056	65.2	37,070,103	11,650	31.4	−33.8
Ceylon	14,076,141	391	2.8	20,200,235	382	1.9	− 0.9
Denmark	10,382,000	1,351	13.0	13,678,000	1,336	9.8	− 3.2
England and Wales	136,120,085	59,240	43.5	178,978,660	42,081	23.5	−20.0
Ireland	24,699,974	7,916	32.0	21,925,004	5,277	24.1	− 7.9
Jamaica	2,989,079	3	0.1	4,220,187	1,505	35.7	+35.6
Massachusetts	9,793,350	1,234	12.6	16,832,078	1,941	11.5	− 1.1
Netherlands	21,542,127	6,444	29.9	29,602,284	5,663	19.1	−10.8
New Zealand	2,833,735	774	27.3	4,963,561	258	5.2	−22.1
Norway	9,694,600	1,324	13.7	11,683,500	1,680	14.4	+ 0.7
Ontario	9,000,000	798	8.9	11,805,519	1,282	10.9	+ 2.0
Prussia	141,183,802	72,663	51.4	199,629,445	47,584	23.8	−27.6
Scotland	19,282,219	12,730	66.0	23,528,940	10,190	43.3	−22.7
Sweden	23,305,010	4,159	17.8	27,029,454	3,940	14.6	− 3.2
Switzerland	14,480,395	2,944	20.3	18,458,916	2,903	15.7	− 4.6
Total	596,277,482	312,584	52.4	783,671,344	186,282	23.8	−28.6

the mortality from whooping cough has declined by more than 50 per cent. when the average death-rate of 1903 to 1912 is compared with that of 1863 to 1872. This reduction has been fairly constant from decade to decade; it has been equally rapid and constant for both sexes, and, finally, this table again illustrates the excessive mortality of the female as compared with the male sex. In Massachusetts this excess has been from 20 to 30 per cent. throughout the fifty-year period.

In the following table and chart on page 1007, there is presented a convenient summary of the statistics of whooping cough at the most fatal ages, under five, for ten representative cities for a thirty-year period. The rates are based upon estimated populations under five years of age. It may be added that of the aggregate mortality from whooping cough in these ten cities during the thirty-year period, 97.0 per cent. of the deaths occurred at ages under five.

Table XI brings out quite clearly the important fact that the mortality from whooping cough in any given locality is a very fluctuating factor. The range in the sixty quinquennial average rates was from 50.0 for Cleveland, 1898 to 1902, to 367.4 for Washington, D. C., 1898 to 1902. On the other hand, when the mortality for the ten cities is combined it is shown that in the aggregate there has been a continuous decline in the death-rate during the thirty-year period. The decline was very slight from 1883–1887 to 1888–1892, but subsequently to the latter period the rate has declined rapidly to 157.3 during 1893–1897, to 129.3 during 1898–1902, to 106.0 during 1903–1907, and finally, to 78.4 during 1908–1912.

A Century of Whooping Cough Mortality in New York City.

For New York City whooping cough mortality data are available during a period of more than a century and they indicate that there has been a pronounced decline in the death-rate

TABLE X.

MORTALITY FROM WHOOPING COUGH IN MASSACHUSETTS, AGES UNDER FIVE, WITH DISTINCTION OF SEX, 1863–1912.

Periods.	Males.			Females.		
	Population.	Deaths.	Rates per 100,000 population.	Population.	Deaths.	Rates per 100,000 population.
1863–1872	732,139	1,250	170.7	729,437	1,577	216.2
1873–1882	878,511	1,244	141.6	874,733	1,548	177.0
1883–1892	970,953	1,160	119.5	959,212	1,382	144.1
1893–1902	1,287,603	1,282	99.6	1,273,734	1,622	127.3
1903–1912	1,528,611	1,211	79.2	1,498,325	1,544	103.0
1863–1912	5,397,817	6,147	113.9	5,335,441	7,673	143.8

MORTALITY FROM WHOOPING COUGH
FIFTEEN REPRESENTATIVE AMERICAN CITIES



TABLE XI.

DEATH-RATES FROM WHOOPING COUGH IN TEN AMERICAN CITIES, 1883–1912.

(Rates per 100,000 Population, Ages under Five Years.)

Cities.	1883–87.	1888–92.	1893–97.	1898–02.	1903–07.	1908–12.
Boston, Mass.	194.4	141.7	121.6	154.1	160.6	122.4
Cleveland, Ohio	97.8	131.8	85.7	50.0	75.6	69.4
New Haven, Conn.	243.8	193.6	185.4	241.7	141.1	125.5
New York City, N. Y.	271.8	281.9	198.8	123.8	68.4	55.7
Philadelphia, Pa.	112.0	123.0	161.9	128.0	176.4	122.8
Providence, R. I.	172.3	269.0	183.4	214.1	168.2	116.4
Reading, Pa.	85.5	43.3	43.9	108.4	81.5	50.3
St. Louis, Mo.	79.0	75.9	82.7	69.7	98.0	62.6
San Francisco, Cal.	116.4	97.2	77.6	117.6	183.4	102.8
Washington, D. C.	334.9	309.0	235.7	367.4	195.1	135.0
Total	188.8	188.1	157.3	129.3	106.0	78.4

from that cause. The decline, however, has not been constant, and in fact the reduction has mainly occurred subsequent to 1889. The following table together with the accompanying chart, present an adequate summary of the mortality from whooping cough in New York City during the century interval, 1813 to 1913.

THE MORTALITY FROM WHOOPING COUGH IN NEW YORK CITY (MANHATTAN AND BRONX BOROUGHS), 1813–1913.

(Death-Rates per 10,000 of Population, Ages under Ten Years.)

Periods.	Population, ages under 10 years.	Deaths, all ages.	Death-rate.
1813–1822	333,628	613	18.4
1823–1832	519,060	953	18.4
1833–1842	752,311	1,296	17.2
1843–1852	1,118,502	1,421	12.7
1853–1862	1,786,183	2,680	15.0
1863–1872	2,243,716	2,613	11.4
1873–1882	2,493,640	4,150	16.6
1883–1892	2,961,475	4,505	15.2
1893–1902	4,036,476	3,707	9.2
1903–1912	4,995,345	1,938	3.9
1913	544,112	420	7.7

The mortality includes deaths at all ages, but the number of deaths at ages above ten years is so small as not appreciably to affect the death-rates as here calculated upon the population of ages under ten years. The mortality, with distinction of age, is not available for the hundred-year period.

Whooping Cough and Its Complications.

As with measles the fatal termination of a case of whooping cough is usually the result of a complication with some other malady. In 1,000 fatal cases drawn from the experience of The Prudential Insurance Company of America the results are shown in Table XII.

In this investigation single years of life were considered up to and including the fifth, but the variations in the character of the complications were not essentially different at the various ages except in respect of the respiratory and digestive complications. The

TABLE XII.

ONE THOUSAND FATAL CASES OF WHOOPING COUGH, SHOWING PRIMARY COMPLICATIONS.

(Prudential Industrial Mortality Experience, 1911–1913.)

Complications.	Males.		Females.		Both Sexes.	
	Number of deaths.	Per cent. distribution.	Number of deaths.	Per cent. distribution.	Number of deaths.	Per cent. distribution.
Broncho-pneumonia	140	28.3	146	28.8	286	28.6
Pneumonia	125	25.3	145	28.6	270	27.0
Bronchitis	28	5.7	28	5.5	56	5.6
Other respiratory diseases	10	2.0	5	1.0	15	1.5
Meningitis	27	5.5	17	3.4	44	4.4
Cerebral congestion	3	0.6	6	1.2	9	0.9
Heart complications	10	2.0	15	3.0	25	2.5
Digestive complications	43	8.7	36	7.1	79	7.9
Nephritis	2	0.4	6	1.2	8	0.8
Dysentery	—	—	6	1.2	6	0.6
Tuberculosis of lungs	4	0.8	5	1.0	9	0.9
Other miscellaneous	22	4.5	23	4.6	45	4.5
No complications	80	16.2	68	13.4	148	14.8
Total	494	100.0	506	100.0	1000	100.0

details of these in summary form are shown in Table XIII.

In the Prudential Industrial mortality experience the digestive complications were relatively most important in the second year of life and the respiratory complications were relatively most important in the fifth year of life, ranging from 58.5 per cent. of the deaths at age 1, to 80.3 per cent. at age 4.

Attack Incidence of Whooping Cough.

The attack-rate of whooping cough seems, from such limited data as are available, to be highest in the spring months, and lowest in the autumn months. This was true in Aberdeen, Scotland, where this disease was notifiable during a twenty-year period, 1883 to 1902. It is also true for New York City and Philadelphia as is evident from the accompanying chart on page 1015 showing the average case-rates per 100,000 of population of ages under ten years during the seven-year period, 1906 to 1912.

The Aberdeen data show that females have a higher susceptibility to whooping cough than males, and this sex difference holds true at all ages.

TABLE XIII.

DEATHS COMPLICATED WITH RESPIRATORY AND DIGESTIVE DISEASES—ONE THOUSAND DEATHS FROM WHOOPING COUGH.

(Prudential Industrial Mortality Experience, 1911–1913.)

Age.	Total of whooping cough deaths.	With respiratory complications.		With digestive complications.	
		Number of deaths.	Per cent. of total.	Number of deaths.	Per cent. of total.
1 year	543	318	58.5	66	12.2
2 years	184	120	65.2	6	3.3
3 years	126	83	65.9	5	4.0
4 years	56	45	80.3	—	—
5–9 years	81	56	69.2	1	1.2
10–19 years	9	5	55.6	1	11.1
20 years and over	1	—	—	—	—
Total	1,000	627	62.7	79	7.9

The difference is most pronounced, however, at ages under four years. The attack-rates in Aberdeen, with distinction of age and sex, are presented in Table XIV.

At every age, up to the fifteenth year of life when the number of cases was very small, there was a pronouncedly higher attack-rate among females than among males. The attack-rate was highest for males in the second year of life and it was highest for females in the third year of life.

In the Aberdeen investigation of whooping cough a careful attempt was made to learn whether or not the patient was suffering from a first or second attack. On the basis of 15,094 cases, of which 7,278 were males and 7,816 were females, it was found that the reported second attacks numbered only 2.6 in a thousand for both sexes combined, 1.5 per thousand for males, and 3.7 per thousand for females. The greater liability of females to second attacks held true for all ages.

Control of Whooping Cough.

It is impossible to say how much sickness is caused by whooping cough in any given year in the United States, or in any other country. In fact it is doubtful if exact knowledge on this point is at present available for any city in the world. The reporting of this disease, even under compulsory notification laws, has thus far proved to be quite unsatisfactory because of incomplete registration. Thus far this disease has presented almost insuper-

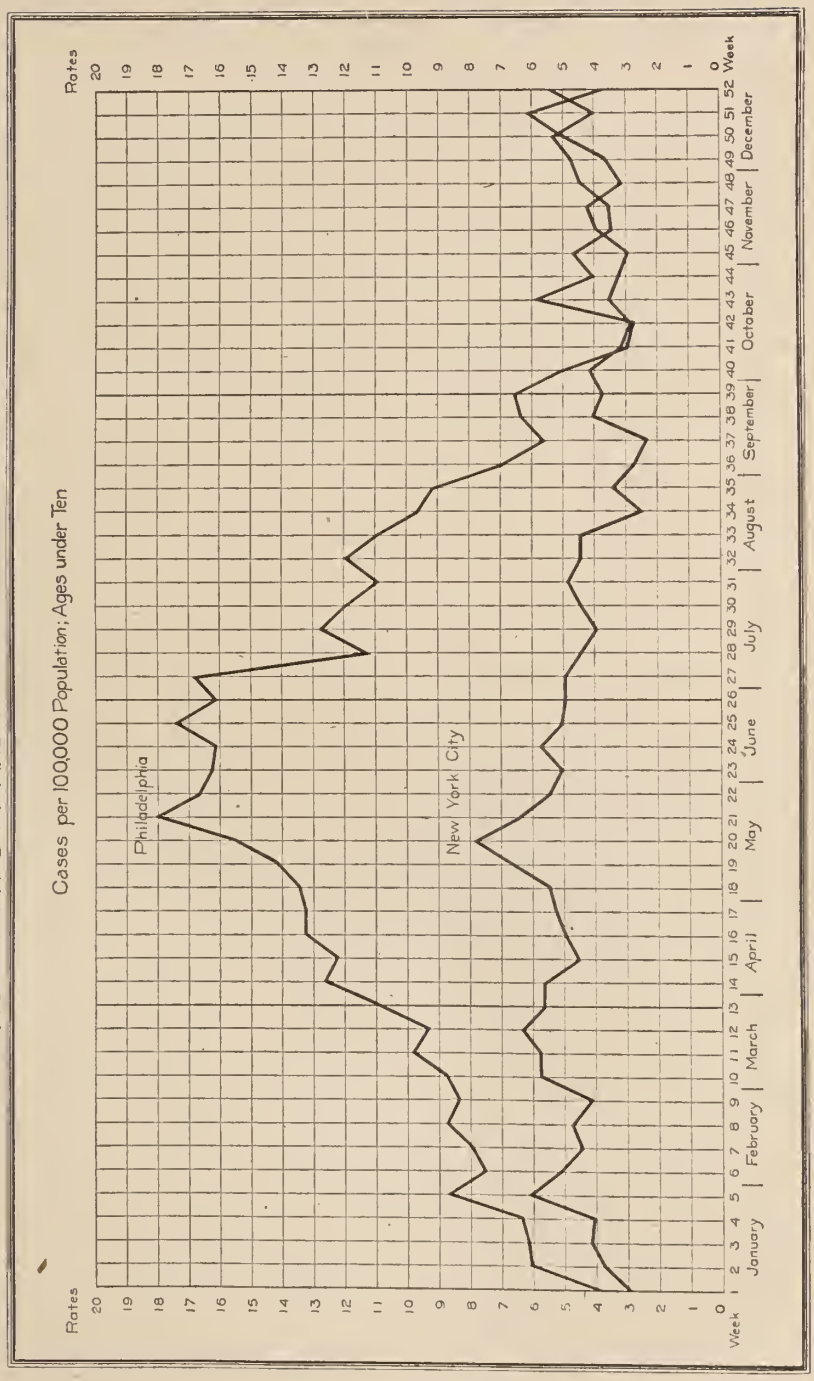

AVERAGE WEEKLY CASE RATES FROM WHOOPING COUGH
NEW YORK CITY AND PHILADELPHIA. 1906–1912
Cases per 100,000 Population; Ages under Ten
Rates
Philadelphia
New York City
Week
January
February
March
April
May
June
July
August
September
October
November
December

TABLE XIV.

WHOOPING COUGH ATTACKS PER 1,000 OF POPULATION WITH DISTINCTION OF AGE AND SEX, ABERDEEN, SCOTLAND, 1891–1900.

Age.	Males.	Females.	Excess of female over male rates.	
			Actual.	Percentage.
Under 1 year	65.7	73.6	7.9	12.0
1 year	68.6	79.0	10.4	15.2
2 years	66.5	80.8	14.3	21.5
3 years	58.7	70.9	12.2	20.8
4 years	49.7	59.4	9.7	19.5
5 years	50.7	53.7	3.0	5.9
6 years	33.5	39.7	6.2	18.5
7 years	18.6	19.2	0.6	3.2
8 years	6.8	10.3	3.5	51.5
9 years	3.6	4.1	0.5	13.9
10 years	1.6	2.0	0.4	25.0
11 years	1.1	1.7	0.6	54.5
12 years	0.5	0.9	0.4	80.0
13 years	0.5	0.9	0.4	80.0
14 years	0.3	0.2	−0.1	−33.3

able difficulties in the way of accurate and complete registration. Chief of these, perhaps, is the fact that many cases are never attended by a physician, and another serious difficulty arises from the fact that many cases are not diagnosed as whooping cough, particularly when the patients are so young or so old that the disease does not present its characteristic whoop.

The early diagnosis of whooping cough is difficult, and sometimes almost impossible even to capable physicians, and, when to this difficulty is added the fact that this disease is most contagious in its early or catarrhal stage, it can readily be seen that we have a combination of conditions which operate strongly against any efficient control. The best hope for good results in this direction seems to lie along educational lines. Physicians, nurses, school teachers, parents and the older children need more information as to the signs by which the disease can be detected and what to do when it is discovered. The necessity of isolation and quarantine of the non-immune, including house placarding and plain tagging of patients when out of doors, does not thus far appear to have received the attention which they deserve.

The statistics of this disease teach that whooping cough requires much more careful study than it has ever yet received; that it is still surrounded by a hazy nimbus composed partly of igno-

rance and partly of half-knowledge; that it is a disease the mortality from which entitles it to more serious attention than it usually receives at the hands of both physicians and parents; and, finally, that there is a great need for intensive statistical investigations conducted by properly qualified investigators—investigations which shall extend from the patient to the laboratory and embrace every item to which the statistical method of analysis is applicable. Such investigations, if properly conducted and if given sufficient publicity, would undoubtedly go far to remove the present widespread ignorance of this disease, the fatal result of which is so adequately expressed by Anders in his "Practice of Medicine" when he states that "The gravity of pertussis is scarcely appreciated either by the general physician or the public, and there is more criminal neglect in connection with whooping cough than with any other disease."*

*James M. Anders, M.D., Practice of Medicine, Philadelphia, 1910, p. 227.

IMPORTANT DETAILS OF PRACTICAL PLUMBING.

HARRY Y. CARSON,
New York City.

Read before the Engineering Section of the American Public Health Association, Jacksonville, Fla., December 3, 1914.

AS a branch of building construction and of modern sanitation, plumbing is demanding more attention each year. This is strongly emphasized when we realize that out of approximately two billion dollars' worth of building materials of all descriptions sold annually in the United States, nearly 69 millions are spent each year for plumbing, as compared with 62 millions for structural steel, 90 millions for bricks, about 100 millions for paint.

GROWTH AND IMPORTANCE OF PLUMBING.

It is worthy of note that many large modern structures accommodate 10,000 to 20,000 people and often in congested districts twice this number may use a single building daily. Many of our present-day hotels house the population of a fair sized town and even the residences of many wealthy folk with their army of attendants and servants attain the magnitude of villages.

In addition to this massing of the people into urban districts, there is a growing demand for personal cleanliness and we now install many plumbing fixtures where one, or even the old privy vault of a few decades ago, was considered a luxury. Immeasurable benefits have been derived from the lavish uses of water and plumbing fixtures. Much of the hard drudgery imposed upon house-wives has been eliminated by the kitchen sink and the laundry tub and our whole system of living has been safeguarded against the inroads of disease which in past years put whole cities or whole nations temporarily out of commission. Plumbing is accountable for a large share of these better living conditions. But in spite of all this, house drainage work is just being given serious consideration by capable engineers.

The plumbing work of large modern buildings comprises in reality the water supply and the sewage disposal systems for communities that equal or even exceed many small cities. Many of our large buildings pump their supply of water from private or public sources and the sewage is sometimes treated in sterilizing tanks before dumping it into the public sewers. All this calls for a high class of sanitary engineering skill which, unfortunately, is at present lacking.

PLUMBING LAWS INCOMPLETEIN SCOPE.

Our plumbing laws are, to a very large extent, based upon unscientific, and erroneous, principles. They are full of errors and look as if they have emerged from some dark alley of thought. Beyond a doubt, our city and state public health rules must come to be framed with equally painstaking care for the sewerage systems of such large buildings which accommodate many thousands of people, as for the sewerage system of towns or cities of equally populous districts.

There are many who condemn present-day plumbing practice but few

who are willing to work out remedies. Very seldom the same care is exercised in the specifications of plumbing work as for instance is common with the steel beams and columns of our buildings. Yet the failure of the plumbing is quite as serious an economical question as the failure of the structural framework.

Often the burden of responsibilities is thrown upon the city authorities by the all-inclusive clause: "The plumbing work shall be installed in strict accordance with the rules and regulations of the city health authorities." Thus the engineer relieves his mind of these complicating problems, and is glad to be rid of them.

In view of such a condition we, therefore, must look to our public health boards for meeting the situation. There is undoubtedly a large amount of public and private capital that is uselessly expended every year on account of the un-engineering method (if we may use this term) of installing plumbing. I have in mind such costly items as the main house traps, which in spite of the fact that capable men have shown them to be a nuisance, still exist in our regulations, presumably on account of old ideas regarding the composition of sewer air. These details should, at least, warrant the attention of the sanitarians with whom broad police powers have been granted to safeguard our welfare.

We must come to study the problems with a view toward a better and a more clearly defined legislation.

In the past much energy has been expended in discussing minor details of plumbing work, such as whether this or that make of fixture trap is proper or "dangerous," and whether one method of venting should be used in buildings to the exclusion of all other methods. At the same time many of the major short-comings of plumbing, such as the enormous waste of the municipal water supply through defective fixtures and the defects in the house sewers (which let ground water into the sanitary sewers) are not even considered when the plumbing laws of our cities and towns are being framed or revised. To improve matters materially, we must influence some of those major public expenses and bring about the greatest economy to the owners of property and to the public without permitting or allowing anyone to create conditions that may cause public nuisances.

Space does not permit of our going into a full discussion of all these details because such would lead us deeply into economics and the general effect of plumbing sanitation upon the public health, but it is the purpose of this paper to merely mention a few of these important items.

Tile House Sewers Source of Ground Water in Sanitary Sewers.

In practice it seldom happens that a house sewer is constructed as carefully as the main sanitary sewers in the streets. The branches leading into the houses from *Y* fittings in the trunk lines have a total length, when taken collectively, far greater than the main lines. These branch lines to the house should be, *but unfortunately are not*, the most carefully constructed parts of the whole sewerage system. These main house sewers, which are continuations of the house drainage system, are put

in by the plumber or owner at "any old gradient" and sometimes without a single cemented joint. Invariably the settlement of the soil, which is usually loosely packed about the house sewers, causes these lines to sag and open up still more at the joints. Defective joints allow the ground water and seepage from the buildings to flow into the sewers along with the household wastes. The evil effects of ground water in the sanitary sewerage system and the consequent added cost to the community are too well known for repetition here. Edward D. Rich has compiled data for a sewage flow chart showing the typical flow at small sewage disposal plants during the several months of the year. This chart demonstrates the importanee of keeping ground water out of the system. It can be noticed that during the wet seasons of the year when the ground water level rises considerably above the sewers there is an enormous increase in the quantity of the sewage handled by the system and this, of course, adds a large extra cost to the community as a whole. One other effect of this leakage is the possibility of soil pollution in the immediate vicinity of the sewers, but this is not likely to have any serious effect upon the larger problem of sewage disposal, although it may affect water supplies. Also the roots of lawn trees often enter and clog such sewers. A remedy for these difficulties can be found by insisting that the property owners extend the main house drain, which is of iron, to the main tile sewer in the street or alley. It is also essential to make a thoroughly tight joint with the main sewer and thus eliminate most of the trouble from ground water in sewage disposal systems.

Materials Best Suited.

In this connection we might dwell very briefly upon the question of materials from which the drainage pipes and house sewers should be constructed. Well made vitrified sewer pipe will undoubtedly last longer than any other kind of pipe but is unsuited to withstand temperature stresses from alternate hot and cold sewage or settling and shifting of the line due to soil movement, settlements of buildings and root growths. However, as properly made extra heavy cast iron soil pipe with leaded joints is known to have lasted much longer than the expected life of modern structures, it may be relied upon to maintain a thoroughly water tight sewer line between the plumbing fixtures and the sanitary sewer. Other forms of iron pipe, such as wrought steel, are more suited to withstand conditions where excessive tensile stresses are met in practice, but have such a short life that provision must be made for their frequent replacing. Wrought pipe is expensive and rusts out.

Curtailment of Public Water Waste.

Another point of vital importance is the curtailment of our enormous water waste. It is common knowledge among water supply engineers that an enormous amount of public water (sometimes as much as a fourth of the total consumption) is wasted through bad types of plumbing fixtures. Metering individual services does not prevent the loss, although it makes it possible for the water corporation to more accurately adjust the charges against consumers. In this respect the matter of good and bad types of plumbing

fixtures in common use at the present time must be considered. The plumbing laws must point out to the public which types are bad, but special provision must be made to eliminate improper plumbing equipment which may cause an unnecessary waste of water down the sewer. Another source of water waste in cold climates is that used in winter to prevent pipes from freezing. In poorly heated houses a faucet is commonly left running continuously at full stream to prevent some uncovered water pipe from freezing. Much can be done to eliminate this source of waste if the water lines as well as the drainage lines of new work are carefully inspected by a capable plumbing expert. To my best knowledge no plumbing code in this country properly provides for this phase of plumbing inspection. Another very important item is the water wasted annually through the defective service connections, poor jointing of pipe, and the injudicious selection of piping material. A large part of these useless water wastes belong to the realm of bad plumbing.

Requirements for Public Plumbing.

For public and semi-public plumbing such as comfort stations, bath houses, railway and office toilet rooms or public school plumbing, our laws must explicitly and clearly define the practices. The toilet rooms designed for public or semi-public use should contain the most sanitary types of plumbing fixtures and plumbing materials obtainable. The rooms should be so located that sunlight can shine directly into them. The volume of air in each toilet should be regularly and completely changed at least four times each hour when in use. Wood floors and walls plastered with a soft porous finish are a constant source of foulness; and, where toilet rooms so constructed are put to hard use, they not only become a nuisance but are often a serious danger to those who must use them. The toilet rooms should have impervious floors and walls. All fixtures and partitions should be smooth of finish, light in color and impervious to moisture. Every public toilet room should be equipped with a hose cock and floor drain so that the entire room and fixtures may be easily and quickly washed down with a hose.

Summary.

In summing up, let me say that modern plumbing work presents complicated engineering problems which indeed are as important to our future welfare as the building of useful and safe structures.

The acquirement of plumbing has been so rapid that practice in different parts of the country varies a great deal. The draining of large buildings presents big engineering problems which become more and more complicated as we develop other lines of endeavor. The solution of these problems have unfortunately been left largely to the artifices of rule of thumb methods. We all regret to see such unfortunate conditions prevailing in such an opportune and fruitful field, but the time must come when, for economic reasons alone, our present practice of plumbing will expand into an important branch of engineering. We will then probably come to look upon it as "Plumbing Engineering" which is really a more descriptive name.

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THE ROCHESTER MEETINGS.

The 1915 meetings of the American Public Health Association held last month were in many ways unique in the history of the Association. There was a record attendance of 477 members, 122 more than at any previous meeting! With these members and the throngs of New York state health officers it made, indeed, a splendid gathering. The meeting was graced by the presence of the founder and first president of the Association, Doctor Stephen Smith of New York City. None who were present at the memorable meeting in Convention Hall will forget the wonderful reception accorded to Dr. Smith on his taking his place on the platform.

Much of importance transpired at the meetings; the scientific programs were unusually interesting and well attended; a new constitution and by-laws were adopted; and a new Board of Directors representing all parts of the countries included in the Association appointed. In addition one might mention the splendid address of the president, Prof. William T. Sedgwick; the unanimous election of Dr. John F. Anderson as president for the coming year; the honoring of Doctors William C. Gorgas, Henry D. Holton, Frederick Montizambert, George M. Sternberg and Stephen Smith, by their election to honorary membership in the Association. The Association voted to hold its 1916 meetings in Cincinnati. Certainly not the least important feature of the meetings was the splendid and earnest spirit of the men and women assembled. One could not help but notice the strength and unity of purpose of all these people and it made one feel very safe with regard to the continuance of the great work of life conservation in our countries.

As a significant sign of the times we might well refer to the address of Governor Whitman of New York State. It represented the attitude of a broad-minded state executive toward the public health movement of today.

Governor Whitman pointed out that "public health is only one of many fields of public work which are growing and expanding year by year, and demanding constantly larger appropriations which they are able to justify by valid evidence of excellent results attained. Meanwhile, city and state debts and tax rates are mounting to an unprecedented degree." Yet he concluded that "public health is one of the social activities of the state whose development should be curtailed only in the very last necessity." After a keen and incisive review of the more important phases of the public health campaign—in relation to infant mortality, communicable diseases, tuberculosis and the diseases of later life—Governor Whitman points out as a justification of public health work, even on economic grounds, that the reduction in the New York state death-rate of .4 per 1,000 in 1914, as compared to 1913, corresponds to a saving of 4,000 lives which, taking the ordinary estimate of $5,000 for the average value of a human life, "means an economic saving of $20,000,000 due to progressive health work in a single year."

Most inspiring of all is the Governor's attitude toward the integrity of the public health service and its freedom from political control.

Finally, those who have watched the admirable results of the system of state health organization through a corps of district sanitary supervisors in force for two years in New York state will welcome the Governor's cordial approval of the plan as "most important and beneficial to the local communities." He adds, "I sincerely hope that some means may be found by which the services of these physicians may be retained, and feel confident that next year, when the members of the legislature are made fully acquainted with the facts as to the value of these services, funds will be provided for their continuance. I shall use my influence to attain this end, for, while rigid economy in the administration of the finances of the state is essential, savings in expenditure attained through decreased efficiency in health work are not only unwise but resolve themselves, in the end, into irreparable waste of the most valuable resources of the Commonwealth."

THE STANDARDIZATION OF PUBLIC HEALTH WORK.

W. S. Rankin,
Secretary, North Carolina State Board of Health.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 3, 1914.

The Principle of Standardization.

STANDARDIZATION is the establishment of relative values. The principle is as old as the Phœnician civilization, its birth dating back beyond Rome and Greece to the introduction of weights and measures. It is one of those fundamental principles of civilization the suspension of which would cause chaos to take the place of civilized intercourse and understanding.

Standardization Applied to Public Health Work.

It has for its end the establishment of means by which the public may ascertain the relative efficiency of health officers. For behold, there are good and bad health officers, just as there are good and bad men, good and bad doctors, good and bad angels. The people who employ the health officers—both kinds—should have some way of differentiating between the genuine and counterfeit. A standard should be created, if such is possible. Those who have the political right to select and dismiss health officials should also be given an intelligent right so to do. I believe public health work can be standardized.

Conditions for Standardization.

The first condition is a considerable degree of similarity in the several health jurisdictions to which it is desired that the standard should apply. In our search for similarity of conditions, we would naturally go from the larger and more complex governmental units to the smaller and simpler units. Similarity of conditions is less between countries than between states and provinces, and less between states and provinces than between counties of the same state or province; hence we find that the counties offer a greater degree of similarity of conditions than other governmental units and, therefore, are, so far as the first condition is concerned, the best fields in which to attempt a standardization of health work.

The second condition is some central agency influential, financially or governmentally, with the health jurisdictions in which standardization is to be attempted. Between countries there is no such central agency. Between the different states we do have a central agency, the federal government. But any attempt on the part of the federal government to standardize state health work would encounter the principle of state sovereignty and politics. Nevertheless the work of the American Medical Association under Dr. Charles V. Chapin and the work of the United States Public Health Service under Surgeon Fox, directed ultimately toward standardization with the state as the unit, is to be

highly commended. When we come to the county we find the second condition, as we found the first condition for standardization, most favorable. Between the counties we do find in the state government a central influential agency. The state and county governments are intimately related; the county politically and governmentally is a constitutional unit of the state and in the state legislature the county and the state have a common representative. We see, then, that the county in supplying our second condition is the best field for the standardization of health work.

The third condition is either an absence or an immature and very youthful health department in the health jurisdiction in which it is desired to bring about standardization. This third condition is not found in countries or states, for practically all countries and states by this time have health departments with fairly fixed and definite ideas as to plan and method. "You can't teach an old dog new tricks" is more or less axiomatic so far as any attempt at standardization with reference to countries and states is concerned. On the other hand, when we come to the county, we find either no health department or an immature health department. This baby health department is pliable and docile and susceptible to the influence of the mother state. To it the axiom "Train up a child in the way he should go; and when he is old he will not depart from it" will apply. We see, then, that the county supplies the third condition for standardization of health work in a degree that no other governmental unit or health jurisdiction supplies this condition.

We have purposely omitted the consideration of the municipality as a possible field for standardization. The municipalities fall short of the counties in all three conditions for standardization. The municipalities lack the proper degree of similarity. They vary in size, climate, and race. The municipalities lack intimate relation to some central correlating influence. The county is a primary and constitutional unit of the state government, whereas the municipality is a secondary and supplementary unit of the state government. Most municipalities have already some kind of a health department which it would be necessary to tear down before a new one could be established.

Conclusion: *In any attempt at standardization of health work the county is the field of election.*

The Essentials of Standardization.

The first essential is a health official of fixed, established efficiency, that is, a standard health officer. There is a prevalent error, especially pronounced and dangerous to controvert in medical assemblages, to the effect that the average physician will make on his appointment or election to a health office an efficient health officer. There is just as much sense in claiming that the average physician is a dermatologist, a pathologist, an ophthalmologist, a surgeon, or any other specialist as that the average physician is a health officer whenever an undiscriminating public puts him where a health officer is supposed to be. *The efficient health*

officer is a specialist—as much a specialist as is the surgeon or ophthalmologist.

Now, the *sine qua non* of a specialist is not information, but practice; not knowledge, but skill. And where does the specialist acquire practice and skill? With the exception of the laboratory worker, he gets these essentials in a well-ordered hospital. And now to the quick: What in public medicine is the analogue of the well-ordered hospital in private medicine? The well-ordered health department. As in the hospital, the application of remedies to the sick cellular organism is practised, so in the health department is the application of remedies to the sick social organism practised. If I am right in my fundamental contention that the efficient health officer is a specialist, then the road to specialization in health work lies through an apprenticeship in a well-ordered health department.

Extended academic and laboratory courses and degrees will help, but will not make an ophthalmologist a surgeon or a health officer. The work of several of our best universities in giving special courses and degrees in public health is a commendable public service; nevertheless, the *great* need of public health work today is not additional academic training of medical graduates, but the practical training of medical graduates through apprenticeships in our best health departments, federal, state and municipal, preparatory to the vocations of health officers.

I believe the time is ripe for a committee representing this Association to confer with the Council on Medical Education of the American Medical Association for the purpose of interesting the Council in the selection and utilization of the efficient boards of health of the country for the practical training of medical graduates for the field of public medicine, just as the Council is now utilizing the efficient hospitals of the country for training medical graduates for private medicine. Without entering into details, I may say that a plan of mutual advantage to apprentice and department seems feasible. Such a plan might include the idea of training in several health departments, each of which had gained a reputation of proficiency in some special work, just as a physician might attend different clinics for their special advantages.

Whether such a plan of practical training for health officers becomes general or not, the North Carolina State Board of Health has included, in its legislative program for the coming year, provision for the practical training of from three to five medical graduates each year for positions of whole time county health officers. To illustrate the principle of practical training, I will give briefly our tentative plan. To the five or six counties that will decide during 1915 to employ full time county health officers, the State Board of Health will give the advice not to employ inexperienced men; the Board will advise delay in starting the work until a trained man can be had; the Board will disclaim any responsibility for the outcome of the work if its advice is not followed; and the Board will further tender its service in finding a man agreeable to the county and in giving this man from

six to eight months practical training. This will consist of a six or seven months' course apportioned about as follows:

(a) State Health Administration or State Health Laws and Policies, four weeks. During this course the apprentice is assistant to the executive officer of the Board, answers as much of the official mail as he can, and is referred to and quizzed upon the proper literature.

(b) Vital Statistics, four weeks. During this time the apprentice is given actual experience in every phase of the work of the Bureau of Vital Statistics, is referred to proper references on Vital Statistics and is required to study and criticize the vital statistics table appearing in various reports.

(c) Popular Sanitary Education, three weeks. During this course the apprentice is required to prepare articles for the Bulletin and press service, to study exhibits, slides and lanterns, and to act as assistant to the Bureau Chief.

(d) Tuberculosis, four weeks. During this time the apprentice assists in the State Sanitorium and in the Bureau for Tuberculosis and is assigned the proper reading and is given quizzes upon it.

(e) Laboratory, four weeks. During this time the apprentice will do the routine examinations of the State Laboratory and be quizzed on the interpretation of water analysis and upon epidemiological procedure.

(f) County Health Work, six weeks. During this time the apprentice will serve as assistant to an efficient county health officer and will be sent to see special phases of county health work in different counties.

On the completion of this six or seven months' practical course, a certificate of proficiency in public health work signed by the president and executive staff of the Board will be given the apprentice.

Now to return to our text. We believe that such a man, a man of fixed, established value, in short, a standard health officer, is the first essential in the standardization of health work.

The second essential in the standardization of health work is the ability to secure comparative results from two or more workers who have practically identical health problems. This, as we have already indicated, is possible through the systematic development of county health work and is made feasible through the employment of standard health officers. A conference of several whole-time county health officers, leading to the adoption of a standard plan of county health and with a standard form of monthly report, would permit of the monthly publication in the Bulletin of the Board of Health and in the state and county papers of the comparative results obtained by the different men in the different counties. The publication in untechnical language and form of comparative results of the several whole-time county health officers at work is absolutely essential to standardization.

The Results of Standardization.

Standardization will establish the relative value of health officers. Stand-

ardization will place health work on a basis of merit and will move it away from the avaricious grasp of the politician, whose palm is already beginning to itch. Standardization will create a strong demand for health officers and bring about competition on the part of numerous counties that will be interested in securing the most efficient men available. Standardization, through the competition that it engenders, will result in adequate remuneration for health officers, county and state, for the state will have to pay for health work in proportion to what the counties are willing to pay. Standardization, through the adequate remuneration of health officers, will make a strong appeal to the medical and engineering professions and result in a higher average type of health officer than we have at present. Standardization will guard the public against *pseudo* health work and give the public an easy means for knowing just what it is obtaining for its money. Standardization is of mutual advantage to both parties to the contract, to employee and employer, to the health officer and to the public.

Discussion.

Dr. C. J. Hastings (*Toronto*): I feel that we are very much indebted to Doctor Rankin for having presented this matter, because if there is anything we lack more than another, it is standardization and uniformity of action. It reminds me of an occurrence nearly a quarter of a century ago when I graduated in medicine. I asked one of my most practical Professors—I was intending crossing the Atlantic to take a post-graduate course—what degree he would recommend me to take over there. He replied "Spend your time in the hospital over there getting all the practical work you possibly can. The degrees are very excellent in themselves, but after all I think that the most valuable asset that a public health officer can have in the administration of his duties is an ample equipment of good common horse sense."

Dr. J. F. Ferrell (*Washington, D. C.*): Dr. Rankin has discussed a subject which I believe is coming to be regarded as one of the most important that is confronting the health agencies of states and cities throughout the country. I think that it is absolutely necessary that there be some plan by which those men who contemplate going into health work will have an opportunity of getting the practical experience in a way similar to the practical experience that is given the medical man in his hospital training. The plan that Doctor Rankin has outlined, it seems to me, is most excellent for those men who have just finished their medical training and are anxious to enter the field of preventive medicine. In the beginning, in any field, most men expect to receive a moderate compensation, and they in all instances will not feel able to go to some of the colleges and take the long courses. Many of them are going to hold subordinate positions where the salaries will not justify them in taking these long courses. In cases of this kind it seems to me that it is necessary for the state health departments, some of the larger municipal health departments, together, perhaps with the state universities, to get together and provide short courses for the training of these men. There are going to be, however, a number of men needed for the more important health positions throughout the country, and it is going to be necessary to continue to have the long courses that we have, and it ought to be made possible for those men who have served these apprenticeships, who have entered the field of public health and have shown special aptitude and special promise to fill bigger positions, to go to these long-course colleges and there equip themselves for larger positions. It seems to me that in addition to what Doctor Rankin has suggested, it might be feasible to have some plan by which scholarships could be awarded to men who offered special promise so that they

could go to these large institutions, take the two years' course and get the practical training both in the large cities and the state departments of health where the work is most efficiently done. Then there should be some means by which these men, after taking this training, could have some assurance that they were going to have an opportunity to carry on the work for which they had prepared themselves. There ought to be some means by which men who take this special and post-graduate training could be made secure in the positions for which they have trained themselves, and it might be possible for some agencies to come together and assist in this direction; and increase the efficiency and practicability, if such be needed, of some of the large institutions for training of health officers and lend real assistance by enabling those men who are working on small salaries, who have shown special ability in health work, to go and take these courses at a minimum of expense. I think that it is not unlikely that provision will be made before a great while for the awarding of scholarships of this kind.

Dr. McCampbell (*Columbus, Ohio*): It occurred to me that the section and the health officers here might be interested in an experiment we have been trying in Ohio. It so happens that the secretary and executive officer of the Ohio State Board of Health is professor of preventive medicine in the Medical Department of the Ohio State University, and we have a rather close affiliation with that, and a plan is on foot to establish a post-graduate medical course for health officers. But until that time is reached it seemed desirable to so something else along the line of educating young men in the field of preventive medicine, so during the last two years we have tried the following experiment: Junior medical students were taken two hours a week throughout the year and various sundry parts of the field of preventive medicine discussed with them and laboratory work provided for them; I mean field laboratory work; for example, the studying of the most modern and up-to-date methods of water purification, sewage treatment, refuse disposal, etc., also laboratory work in diagnosis and control of communicable diseases, especially those diseases belonging to acute exanthema, such as smallpox, scarlet fever, and the like. These same students in the senior year have been given this same work two hours a week. The plan is that when the boys graduate, some 50 of them, that about 40 of them will be placed in the state of Ohio as municipal health officers, if the proposed bill now pending is passed by the legislature. I think the experiment will be watched with considerable interest, that is bringing a medical man out with a rather complete knowledge of the field of public health work, vital statistics, public health law and communicable disease and the engineering end; and the result of this will be very satisfactory. We all appreciate, as was pointed out by Doctor Rankin, that the average physician knows little or nothing about the field of preventive medicine, and if we can bring out a new crop of young men who are interested in this line of work, it strikes me we are accomplishing a great deal.

A Member: May I ask the gentleman from Ohio a question? What is the plan of district health officers? Is your state divided into districts and is there a health officer in every district?

Dr. McCampbell: Inasmuch as the constitution of the state of Ohio prohibits appointing officers in the counties and consequently provides for all county officers being elective and we want to avoid that, and inasmuch as that situation exists, the plan is to combine counties together, based on population and of course geographical distribution also, and place at the head of that district a health officer who is under state civil service. The appointment of that health officer is made by the joint board of county commissioners of those counties on certification of the State Civil Service Commission and with the approval of the State Department of Health and the bill provides also that that district health officer shall work under the supervision of the State Department of Health. The reason we put the appointing power in the hands of the joint board of county commissioners is because we have a home rule provision in the constitution of Ohio and people when they pay out their own money like to have something to say about who is doing the work. They make the provision, however, about the district health officer being a resident of the district. Then we provide for sub-district health officers appointed under civil service the same way and controlled

by the district health officer. It will make instead of 2,200 health officers in the state of Ohio, approximately between 250 and 300, taking into consideration not the big districts but the smaller districts, about 15 district health officers with the remaining sub-district health officers devoting part time to the work, presumably men who were able to pass the civil service examination.

Dr. Fronczak (*Buffalo*): I have noticed that many of the young men after graduating do not even know how to write out a proper birth or death certificate, so we are delivering lectures before the University and every student of the medical department must go to the department of health and study every kind of work done by the health department. In other words we keep them in every one of the nine bureaus in the 27 divisions of the department of health, so that when a man goes through the department and an examination is conducted, he really knows something about preventative medicine, the university coöperating with us in every way possible, and the state also, and I believe that in this way we are preparing a very nice group of young men who will know something about preventative medicine when they graduate.

Dr. Chas J. Hastings (*Toronto*): I would like to make myself perfectly clear in regard to the absolute necessity of a special training for health officers. I was a little afraid I might be misunderstood on account of the emphasis I was placing on the practical knowledge that was necessary. For a man to want to take public health administration without a thorough knowledge and preparation of epidemiology and the value of the vital statistics and public health matters generally, I think would only meet with one result. However, I think it is extremely important for the highest degree of efficiency in public health administration, that every so-called health inspector—I think it is time that we are doing away with the term "health inspector" or "sanitary inspector"—we want health *instructors* and sanitary *instructors*; every one in connection with the department of health should have a thorough training and in order to try it and bring that about we have, in connection with the Department of Health in Toronto, established an institute of sanitary instruction. We have now affiliated with the Royal Sanitary Institute. We give a course of instruction there and require every employee of the department to take that course of instruction and to pass the same examination set by the Royal Sanitary Institute in England. I think we can hope to make very much more headway when we raise the general standard of every person in connection with the department. As Carnegie said many years ago, "It is not the man who can do the work but the man who can get the men around him that can do the work." And I think it is only the man that knows what work can be done and how it ought to be done that can get men for the accomplishing of that work.

THE INCUBATION TIME IN THE CULTURE DIAGNOSIS OF DIPHTHERIA.

ADOLPH GEHRMANN, M. D., *Chicago, Illinois, Professor of Hygiene, College of Medicine, University of Illinois; Bacteriologist, Columbus Medical Laboratory.*

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December 4, 1914.

EVEN after years of experience it happens that practising physicians sometimes lose much of the value of rapid diagnosis by the use of throat cultures from their suspected diphtheria cases, because they do not understand the principles that are involved. Public health and other laboratories can greatly improve the efficiency of this diagnostic method by instructing physicians as to the reasons why the test is conducted in a certain way. What I wish to bring to your attention here is the advantage of immediate incubation over the usual way of handling cultures. By sending or carrying them to the laboratory, and then putting them into the incubator, just this length of time is lost in each case. I find some of my patrons fail to get a good result because they allow the cultures to get cold or even frozen in the winter season, and then bring them in, expecting to get returns from the culture within a few hours. When the swabs and not the cultures reach the laboratory a few hours after being made, or as late as the day following, much time is also lost if the direct examination is uncertain. It is often difficult to make the practitioner understand that it is not merely the act of making a throat culture that gives him a certain result. One pharmacist who received cultures to be transmitted to the laboratory would not have them in his store because of personal fear, so he tied them to the awning outside, and let them hang until they were taken down by a messenger.

Among the various factors interfering with the best results in throat culture diagnosis are the partial spreading of the material on the culture-medium, the delay in getting the cultures into the incubator, and not examining the same microscopically sufficiently early. When I first started the diphtheria diagnosis at the Chicago Health Department, we tried various ways to bring the incubation near to the patient. Small hand incubators were made, and carried about by the medical inspectors or school physicians. Later a thermos bottle scheme with warm oil was tried. These methods were found unhandy except where a considerable number of suspects were to be examined together. The general practitioner found much trouble in keeping his incubator in order, and usually came across the cases unexpectedly. Neither could he always reach the incubator in any reasonable time to make the scheme a success. Following this attempt to bring incubators to the patient, we came to use body incubation as a means to overcome the difficulty, and to make this possible developed the

outfit for diphtheria diagnosis that is presented herewith. Dr. W. K. Jaques, of the department staff, was the first to use the method in practice.

The method has since been used by my patrons at the Columbus Medical Laboratory, and makes it possible to report on practically all diphtheria cultures in five or six hours after being taken from the patient, and not this time after having been received at the laboratory. We often examine cultures when the messenger bringing the same arrives, and the report is taken back by him. Only throat cultures taken late in the afternoon have to go over until the next morning. The special features in my method are the employment of blood serum culture-boxes instead of glass tubes, as usually used, and in the incubation of these boxes by placing them next to the body under the clothing as soon as inoculated, where sufficient warmth enables incubation to proceed as satisfactorily as in any incubating oven. Cultures so placed in body incubation often have a visible growth when they reach the laboratory, and if this is not the case, we at once make a "Klatch" preparation, which will show the presence of a very small number of bacilli growing. The wide surface on the culture-box gives opportunity for making these early microscopic examinations an exact possibility. When cultures are sent a long distance, as over night by mail to state laboratories, it is much better to incubate the cultures first and then send them rather than to do this on arrival.

In diphtheria examinations it is found that a certain number of cases can be diagnosed directly from the swabs, or when a small piece of membrane is placed in the culture it can be fished out and a slide made, which will show the bacilli without the necessity of incubation. Such findings are reliable for a limited number of positive cases, but in the doubtful instances it is necessary to wait for the culture to grow, and the more certainly that the case is negative for diphtheria, just so much longer do we have to wait for a culture to develop completely. When the inoculation is made and the culture immediately incubated, even as short a time as two hours, it gets the growth started; in fact, the culture media should be warm before the mucus from the throat is placed upon it. In this way the bacilli never stop growing, but the active increase goes on directly from the throat to the culture medium. It is very satisfactory to start by body incubation, and later the cultures can be placed in the incubator in the laboratory, allowing time for the growth to come up before the slides are made.

In order to prove the relative efficiency of body incubation and the methods usually used, a number of observations from routine tests, as illustrated in the accompanying tables, were recorded. The plan used was to take actual cultures prepared from both diphtheria and non-specific cases, to incubate some at once, and to place others for various lengths of time under the conditions of temperature, as shown. These were then placed in the incubator and examined about every half hour until it was possible to determine that the bacteria present were

growing. In order to avoid some of the possibilities resulting from making slides from the same place several times, the mucus or specimen was spread out and rubbed into the medium very carefully, so as to get as even a distribution as possible. When the slides were made, the material was taken in a streak-like manner across the surface, or by a "Klatch," so that a new surface was examined each time. The time required for the growth to appear is from the time that incubation begins, and the time of exposure added to this shows the entire length of time intervening from the taking of the culture until it was possible to make an accurate diagnosis.

In our district we do not mail cultures, but send them by messenger. When they are mailed, as to State Board laboratories, there is much time lost. Special delivery does not help much because afternoon cultures have to wait until morning to be examined when delivered during the late night hours. It would be much better to incubate a culture during the evening and then send it to the laboratory than to send it at once and have it lie in the post office over night.

Below are examples of the gain in time that can be expected when immediate incubation of these cultures is practiced. Our experience has proven that the body heat may be used for incubation of throat cultures with perfect satisfaction. If it is not possible to reach an incubator at once, cultures should not be allowed to chill, as the growth is very much depressed. Cultures may be left with the patient, fastened under the clothing, and later one may return with a microscope and make the necessary slides.

Throat Culture.	Disposition.	Laboratory.	Examined.
9 a.m.	Body incubation.	12 m.	12.30+
9 a.m.	By messenger in overcoat pocket.	10.30	3—+
4 p.m.	Body incubation.	7 p.m.	7 p.m. Klatch positive.
4 p.m.	Sent by messenger.	7 p.m. No growth. Klatch negative.	Next morning positive.
9 p.m.	Body incubation.	8 a.m.	8 a.m.+
9 p.m.	By messenger in morning (same as mail).	8 a.m. No growth.	1 p.m.+
8 a.m.	Body incubation at once.	2 p.m.	2 p.m.+
8 a.m.	Laboratory incubation.	2 p.m.	7 p.m.+
8 a.m.	30°, one hour.	9 a.m.	4.30 p.m.+
8 a.m.	40°, one hour.	9 a.m.	4.00 p.m.+
8 a.m.	50°, one hour.	9 a.m.	4.00 p.m.+
8 a.m.	60°, one hour.	9 a.m.	3.00 p.m.+

+ = diagnosis determined positive.

Culture Made.	Disposition.	Arrived Laboratory.	Examined.
9 a.m.	Body incubation.	10 a.m.	12 n.—1 p.m. few cocci, 2 p.m. cocci, 3 p.m.+.
9 a.m.	One hour, messenger, in warm street-car.	10 a.m.	12 n.—1 p.m. 2 pus cocci, 3 cocci.
11 p.m.	Body incubation.	9 a.m.	9 a.m. diphtheria+.
11 p.m.	Office, 60°F.	9 a.m.	1 p.m. diphtheria+.
9 a.m.	Body incubation.	As stated.	4 p.m. staphylococci,+.
9 a.m.	Laboratory incubation.	As stated.	4 p.m. staphylococci,+.
9 a.m.	40°F., 2 hours.	11 a.m.	5 p.m. Klatch, uncertain.
9 a.m.	Body incubation.	As stated.	3 p.m. diphtheria +.
9 a.m.	Laboratory incubation.	As stated.	3 p.m. diphtheria +.
9 a.m.	40° to 50°, 3 hours, outdoors.	12 n., by messenger.	5 p.m., doubtful. Next morning, diphtheria+.
9 a.m.	Body incubation.	12 n.	2 p.m., Klatch, cocci+
9 a.m.	Frozen 2 hours.	11 a.m.	5 p.m., no growth. 8 p.m., Klatch, cocci +.

+ = growth positive.

AN APPARATUS FOR ACCURATELY FILLING DILUTION BLANKS.

R. Freas.
Of the Bacteriological Laboratory of the City Board of Health, Baltimore, Md.

IN LABORATORIES where many routine examinations of milk, water, oysters, etc., are made, the filling and sterilization of 9 cc. and 99 cc. dilution blanks present somewhat of a problem. In our food laboratory we formerly filled the French square bottles with water, then sterilized them. This method was unsatisfactory for the following reasons:

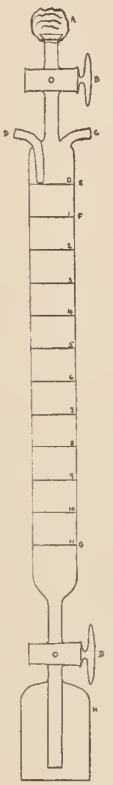
Irregular variations in volume due to the evaporation in the autoclave, thus sometimes causing considerable error.

The necessity of keeping a large number of sterilized blanks on hand, as the operation of filling, autoclaving and cooling required five hours and sometimes even longer.

An occasional dilution blank cracks in autoclaving, escapes attention, and is a possible source of contamination.

These difficulties have been overcome by the designing, testing and use of the apparatus shown herewith.

The burette is of simple construction and is automatic, connected on the right to a simple suction pump (operated by water pressure) and on the left to a two-gallon bottle of sterile water. The top outlet is for the purpose of breaking suction when the burette is filled and is provided with an air filter of cotton. The stopcocks, especially the lower one, are provided with a large hole to allow the water to drain rapidly. The least possible suction necessary to fill the burette is used and when the apparatus is not to be used for five minutes or more the



A, Cotton filter.
B, Stopcocks.
C, Connection to suction pump.
D, Connection to sterile water reservoir.
E, Point of constant level.
F, First, 9 cc. graduation.
G, Eleventh, 9 cc. graduation (0-11 -99 cc.).
H, Shield to prevent dust contamination.

pump is turned off. The burette, connected to the two-gallon bottle with a rubber tubing is sterilized in a large autoclave for thirty minutes at twenty pounds pressure.

We use two sets of filling apparatus sterilized alternately, each one used one or two days. Extra two-gallon bottles of distilled water are stoppered and sterilized each time. With each sterilization of water two dilution blanks, one inoculated with B. subtilis, and the other with Staphylococcus albus, are used as controls of the autoclaving. As a control of our dilution technique three large blanks and three small blanks are plated and three plain controls of agar are made with each day's work. The examination of these controls after forty-eight hours' incubation at 37° shows only one or two colonies on an occasional plate.

AN OUTBREAK OF COWPOX.

A. J. Douglas, M. D.,
Medical Health Officer, Winnipeg, Man.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville Fla., December 2, 1914.

IN THE month of October, 1913, the attention of the Winnipeg Health Department was drawn to what was described as an unusual condition among a number of cows recently purchased by a dairyman supplying raw milk to the city. An examination was made by the departmental veterinarian. This examination resulted in the affection being diagnosed as cowpox. This conclusion was confirmed a day or so after by an independent examination by two other veterinary surgeons. Investigation showed that the disease must have been in existence for some time and was in most instances in advanced stages. In some cows the lesions were pustular, while in others ulceration had set in, the latter probably due to manipulation of the teats during milking. The number of pustules or ulcers varied in each animal and even on each teat. In some only one or two were present, while others showed a dozen or more. Some had become confluent and formed ulcerated patches, particularly at the base of the teats, varying in size from an inch in diameter to more than twice that size. These patches were extremely sensitive to the touch.

The general condition of the animals did not appear abnormal, and milking, with the exception of being somewhat painful, could be carried on as usual. The quantity yielded was about what would be expected from healthy animals. Enquiry showed that all the affected animals had been recently procured from a dealer who had imported them from a distant place, at which it was afterwards found that the same condition had prevailed.

The affected cows were quarantined for a period of a month, at the end of

which the disease seemed to have run its course in those affected. No other cases since developed.

The disease throughout was of a mild type; the pustules, when not disturbed, exuded freely, after which a crust formed over the part, varying in size from a quarter to half an inch in diameter, of an irregularly ovoid shape. The crust then dried up and fell off, leaving a pitted ulcer which soon healed. In the cases where confluence had taken place the conditions were a little aggravated but yielded readily to treatment, which consisted of wiping the teat with a weak solution of carbolic acid and allowing this to dry on the part.

A verification of the diagnosis was obtained when it was discovered that the departmental veterinarian had in some way inoculated himself. The affection in his case ran through the various stages usually seen in a normal vaccination, only in a somewhat severe form. The first symptoms were a slight roughening and itching of the skin over the site of inoculation, followed by papulation, vesculation and pustulation which passed into ulceration with some destruction of tissue. The ulcer took some two months to heal and left a depressed scar about an inch in diameter. Considerable constitutional disturbance was in evidence and much pain and swelling locally. We were unable to ascertain the original source of infection but could find no evidence of human smallpox in the neighborhood from which the affected animals came.

Discussion.

Dr. E. C. Levy (*Richmond, Va.*): I would like to ask Doctor Douglas whether he believes that cowpox is identical with vaccinia.

A great many of the manufacturers have expressed the view that the cows from which Jenner obtained his virus were cows that have been accidentally inoculated with human smallpox, and they have further expressed the view that true cowpox will not protect against human smallpox.

Doctor Douglas: I am afraid I cannot throw any light on that. I endeavored to find out if smallpox had been prevalent in the districts from which these cows came, but could get no history whatever.

Doctor Levy: Did you try to inoculate any vaccinated individual with this?

Doctor Douglas: I did not attempt to go any further. When I get back to Winnipeg, I will inoculate our veterinarian with vaccine and see what will happen.

RURAL SANITATION AND HOOKWORM DISEASE.

Dr. A. G. Fort,
Georgia State Board of Health.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla. December 1, 1914.

THE above-named subject has been presented to this Association, in one phase or another, at each meeting for a number of years. The revelation made by investigations conducted by the Rockefeller Sanitary Commission throughout the State Boards of Health, have impressed us with its general prevalence throughout the southern states and other investigations show the same is true throughout the tropical and sub-tropical countries. The campaign conducted in Porto Rico more than demonstrated the value to a people in its eradication. Therefore, realizing this disease as the greatest one public health factor, from 36 degrees north of the equator, to 30 degrees south of same, I make no apology for presenting this same subject, or rather one phase of it, for your consideration today. Many investigators have presented the result of their studies of the parasite causing the disease and have demonstrated the method of infection and the pathological conditions produced by the presence of it in the human anatomy, and primarily, one phase of its eradication—prevention. I wish to present to you on this occasion, another phase of its eradication and prevention—treatment. This has been referred to in many articles, but no special preliminary treatment or anthelmentic adopted.

In the treatment of hookworm disease, thymol has been and is now the drug in most general use in the United States. This is given in from $7\frac{1}{2}$ to 60 grain doses, after preliminary treatment, which varies according to the age, physical condition and surroundings of the patient. Finely powdered thymol in capsules is the method usually employed. Some prefer to give thymol in the evenings, others prefer to give the drug early in the morning. In the cases which I treated personally, prior to 1910, I used calomel in the afternoon, epsom salts in the evening, and at 5 a. m. the next day gave one half the dose of thymol and at 7 a. m. the remaining half of the dose and at 9 or 10, a dose of magnesium sulphate. This method of treatment was fairly satisfactory, although calomel often times nauseated the patient and occasionally the thymol caused depressing effects. I had no fatalities in my personal work. During the first eighteen months of dispensary work in connection with the State Board of Health of Georgia and the Rockefeller Sanitary Commission, we gave more than 10,000 treatments, using thymol, and unfortunately had three fatalities, but our treatment differed from that which I used in that we gave no calomel on the day preceding the administration of the anthelmentic. The news of a fatality spreads much more rapidly than does the news

of the great benefit to the thousands treated with no untoward effects from the drug. While the fault in two of these fatalities was readily traced to them, nevertheless, the fear of treatment spread in that section and hindered us greatly in our work. My attention was called to the use of betanapthol in the treatment of hookworm through "The Report on Anemia in Porto Rico" in which it quotes Bentley as follows: "By this treatment, I have been able to expel in a number of cases from 500 to 1,000 worms," so in my private practice I had thoroughly tried out this remedy in more than 200 cases and had found it, from clinical reports, as efficacious as thymol. Not only is the drug as efficacious but the poisonous effects are lacking. So we changed in our dispensary campaign from thymol to betanapthol. Dock & Bass on Hookworm Disease, page 223, gives the following table, comparing the value of the two mentioned drugs:

Per Cent of Total Number of Worms Expelled.	
After 1 dose of thymol	76.85
After 1 dose of betanapthol	72.24
After 2 doses of thymol	90.17
After 2 doses of betanapthol	88.12
After 3 doses of thymol	95.28
After 3 doses of betanapthol	93.67
After 4 doses of thymol	96.57
After 4 doses of betanapthol	96.47

We knew that the relative efficiency of these two drugs, given as they recommended, was practically the same. These gentlemen administered their betanapthol in one half the quantity as their thymol, but in our work we have administered betanapthol in the same quantity as we did thymol—from $7\frac{1}{2}$ to 60 grains. While we have no definite figures, it is natural to suppose that if the above table holds true, in giving one-half dose betanapthol, it would be slightly changed in favor of betanapthol in giving an equal quantity. The preliminary treatment followed is identically the same as that given for thymol and the precautions as to the use of alcohol, oils and fats are the same. We have found that there is less complaint of nausea, vomiting and dizziness on the part of the patient when this treatment is used than when thymol is used, and a larger per cent. return for their second, third and fourth treatments than returned when thymol was used. This line of treatment has been used more than 50,000 times, and while we have had a few suffering a slight amount of depression, we have as yet had no fatalities. Taking these things into consideration, we believe betanapthol preferable to thymol.

Oil of eucalyptus has been mentioned, but its relative value is lacking as compared to the two drugs mentioned.

I have never used male fern in treatment of hookworm, but have in many instances used it for hymenolepus nana and other tapes. One who has ever administered thymol or betanapthol and male fern, will utilize either of the first two in preference to the last.

During the summer of 1913, my attention was called by Doctor Dorsey of the city of Atlanta to the following extract found in the *Journal of the*

American Medical Association, page 706, March, 1913: "Oil of Chenopodium in Hookworm Disease—Schuffner and Vervoort state that in their practice in Deli in the last 15 years, they have found uncinariasis extraordinarily prevalent. In the last 8 months they have been giving oil of chenopodium a thorough trial in 1,457 cases, comparing the efficacy with that of thymol, napthol and other vermifuges. Compared with eucalyptus oil with a co-efficient of 38, napthol with 68 and thymol with 83, oil of chenopodium surpassed them all with 91. Another great advantage is that it expels ascarides with the hookworms, thus impressing the minds of the patients much more than when the insignificant hookworms alone are expelled. It is also comparatively pleasant to take." The therapeutics of oil of chenopodium was then investigated, and I found that it had been used with success through a long period of time for ascarides and that it is considered practically free from dangerous effects, and as ascarides quite frequently occur in connection with hookworm infection, we decided to try it in a few selected cases. Doctor Dorsey also called my attention to the fact that neutral mineral oil is not absorbed in the alimentary tract, and suggested that if oil of chenopodium was given with neutral mineral oil we would reach a larger number of parasites than by giving the chenopodium undiluted. We gave it a trial, and in February of this year I received a report which was not complete but led me to believe that this drug was worthy of further consideration. This report was from Doctor Wood and read as follows:

——— Ga., Feb. 23, 1914.

"With reference to my investigations with oil of chenopodium in the treatment of hookworm disease, I wish to first state that the conditions under which these cases were treated were by no means ideal and clinical, for the physiological effects upon the patients could not be noted personally, information being secured through attendants upon the cases or the patients themselves. My report is therefore of necessity far from perfect and only preliminary. At the ———, I found 51 cases. The first half or 25 of these were given 30m. wormseed, with an ounce of liquid alboline in two doses.

"Eat no breakfast; at 5 a. m. take half the medicine; at 6 a. m. take other half of the medicine; at 7 a. m. take dose salts.

"The . . . reported that a few of these were somewhat nauseated and weakened. Nineteen were reëxamined 2 weeks later, 16 negative and 3 positive. The other 26 were then treated with betanapthol in the usual doses and salts the afternoon before.

"Eat no supper; eat no breakfast; take half the medicine at 5 a. m.; take the other half at 7 a. m; take dose salts at 9 a. m."

Upon inquiry, I was informed the last treatment made more of them sick than the first, not nauseated, but weak and dizzy. Eighteen of these were examined later with only 9 negative and 9 positive. But few parasites were secured from either set, as specimens contained much débris and were poorly cared for. All were given oil of chenopodium the second treatment and nausea was reported in several

small boys. At the . . . I treated about 20 cases, some with betanapthol, the others with chenopodium. As much as 50 or 60 min. were given in castor oil with marked depression, nausea and some vomiting. Large doses with alboline were tried, which still produced some vomiting and a feeling of intoxication, then depression. More worms were secured from the wormseed cases than from the betanapthol cases. Some took both treatments. All of them much preferred the wormseed. The doctor in charge of these patients stated that when small doses were given the latter was far more pleasant to the patient and more effective as a vermifuge.

With other cases various methods were tried. Some had alboline, some castor oil, some olive oil and some no oil with the chenopodium. All cases treated with castor oil were nauseated and depressed. Some taking olive oil were nauseated, and some were not sick. Only a few taking alboline experienced depression or nausea. Those taking no oil were not sick but treatment apparently not effective. About 10 cases whose fourth and fifth treatment was chenopodium reported more parasites than with any other former treatment. It seems, therefore, that 15 to 20 min. doses in alboline is the best method of administration, and is preferable to betanapthol or thymol because it is safe and effective.

Further report in June 1914 from Doctor Wood shows oil of chenopodium to produce practically no ill effects. Later, we received the following report from still another county in Georgia:

Report on Oil of Wormseed.

	Treatment	Reëxamined	Cured
First	146	72	18 or 25 %
Second	54	40	10 or 25 %
Third	31	10	8 or 80 %

Since studying the use of this drug, I find that it is used in Sumatra for hookworm disease. Dr. Wickliffe Rose of the International Health Commission writes that the following prescription is used by the physicians in that country.

1. Drug used, oil of chenopodium.
2. Milk diet for one day.
3. Min. 7 at 6 a. m. (oil of chenopodium).
4. Min. 7 at 7 a. m.
5. Min. 7 at 8 a. m.
6. Castor oil at 11 a.m.

Doctor Guthrie of the Johns Hopkins Hospital calls attention to a case which was reported briefly by Doctor Levy, a member of the hospital staff, of a patient who had hookworm infection which was resistant to thymol but which yielded readily to chenopodium. He states that during the past summer, while in Central America, he had opportunity to test the efficacy of the drug. He encountered both the Old and the New World type. The method of administration was as follows:

First day—5 p. m., Epsom salts, oz. 1; liquid diet begun.

Second day—5 p. m., Epsom salts, oz. 1; liquid diet.

Third day—6 a. m., oil of chenopodium, min. XVI in capsule; 8 a. m., oil of chenopodium, min. XVI in capsule; 10 a. m., oil of chenopodium, min. XVI in capsule; 12 a. m. castor oil, oz.

1, plus chloroform, min. XLV; nothing to eat third day until treatment is completed.

He gives his conclusions as follows:

1. The treatment was well borne; no ill effects were noted and no complaints of subjective discomfort were elicited on careful questioning.

2. The treatment was successful in both the Old and New World infections. It sometimes had to be repeated, but it practically never failed to eliminate some worms or to reduce the number of eggs in the stool.

3. It succeeded in cases in which thymol had been tried, sometimes repeatedly, and had failed.

4. When given in parallel series to patients as they came, the chenopodium seemed much more efficient than thymol.

5. The drug is also very efficient for ascaris, somewhat less so for whipworm, and often clears the stool of Strongloides intestinalis, but I do not believe that in such instances a permanent eradication has been effected.

Inasmuch as the supply of thymol and betanapthol is now very limited, and the price of both drugs quite high, and also in view of the fact that the report from many show that this drug is efficacious, and practically non-toxic, I consider it well worthy of your consideration in connection with the treatment of hookworm disease. That it is slightly toxic is shown by the following "Hookworm Disease, Use of Chenopodium," by Murrah Galt Motter. "Toxicologically, a search of the Index Catalogue and the Index Medicus revealed but 12 published cases of poisoning by wormseed oil in something over 50 years, the first having been published in 1852 and the last in 1903. Of these cases 8 were fatal. The report of one of the fatal cases is cited by Wood, with the added comment: 'It is plain that the wormseed was not the direct immediate cause of all these symptoms or of the fatal result.' All of the reported cases, however, show a certain general similarity, indicating that the toxic action is exerted particularly upon the central nervous system. Salant, in a preliminary report of his studies on the pharmacology of this oil, notes the possibility of cumulative action, indicated by the fact that non-toxic doses, when repeated in a day or two, were fatal in the rabbit. In the reported cases of poisoning the dose appears to have been excessive, and in some cases, repeated. Bruning asserts that when properly used this remedy does not cause any unpleasant secondary actions, an experience confirmed by that of subsequent workers."

Dr. Chas. Waddell Stiles has called my attention to the fact that he finds reference to a fatal case in a child 3 years old in a dose of ½ dram of chenopodium. Wilcox in his Materia Medica & Therapeutics refers possibly to the same case.

This discussion of the treatment of hookworm is presented to you from the standpoint of a man on the firing line in the campaign leading to the eradication of this malady. We have in a few of our cases used gelatin capsules, and to our sorrow, as we find, as reported to me by Doctor Holton of Grady Hospital, who has given two treatments, using gelatin-coated capsules, that these

capsules passed through the alimentary tract intact. We believe that in this drug we are made independent of chemical products from other countries, and are looking forward to the time when, in the heavily infected areas of our state, instead of giving spring tonics in the form of some proprietary or patent medicine, the good mothers will find it more beneficial and equally as safe to give a decoction or infusion of the "Old Jerusalem Oak," an ever-present plant in all rural sections of the United States.

A STANDARD CERTIFICATE OF BIRTH.

W. A. Plecker, M. D.,
State Registrar of Vital Statistics, Richmond, Va.

Read before the Vital Statistics Section, American Public Health Association, Jacksonville, Fla., December 1, 1914.

SATISFACTORY blanks constitute an important element in securing prompt reports of births and deaths and full replies to all inquiries. In the beginning of the work of the Virginia Bureau of Vital Statistics, for lack of both time and experience, we adopted various forms in use by other states, feeling assured, at the time, that they were not perfect.

We began immediately, as experience dictated, to study carefully every form in use by us, and to keep notes of such changes as suggested themselves, for use in preparing the second lot. In one or two instances only have no material changes been made with the second order.

The essential points which we have kept before us have been:

Simplicity in wording, considering in all cases the lowest, rather than the highest educational attainment of those who are to make use of them.

Attractiveness and convenience in arrangement, spacing, and print.

Durability in the permanent birth and death blanks, with lightness of weight as far as consistent with conveniences of use. This latter point is a matter of importance when the postage on tons of supplies going and coming is considered. This end has been secured by the use of light paper, and by reduction in size, in some cases.

A new feature, since the extension of the parcel post privileges to printed matter, is the binding or at least padding of blanks, to secure their acceptance at book rates. The birth and death blanks overshadow all others in importance. They are permanent and must be on good quality of bond paper. They are to be mailed in large numbers and must be of light weight.

A more potent reason, however, for the use of thin paper is the question of shelf space which the certificates must permanently occupy when bound and filed, at an ever increasing rate. In the questions of size and general style and appearance, the present accepted standard death and birth certificates scarcely admit of improvement, when the amount of necessary printing and writing upon them are considered.

As to the actual information sought, we believe there is but little room for advantageous change. The only improvement we are able to offer in the death blank, is as to the numbering spaces, which will be brought out in the consideration of the birth certificate.

My experience of some years, as county health officer and registrar of vital statistics, where I was in direct contact with midwives and physicians, together with the added experience as state registrar, convinces me that the present birth certificate will admit of many improvements, as I wish to show in detail, and to demonstrate by comparison of our present Virginia form with that in general use, as recommended by this body (The American

Public Health Association) and the United States Bureau of the Census.

In size, general appearance and actual information sought for, no change is proposed. The apparently slight changes recommended, however, experience shows to be of immense importance in securing complete and correct information from our eight thousand ignorant midwives, most of them negroes, absolutely devoid of education and power of reasoning.

1. The first improvement, which we do not claim as our suggestion, is in the numbering of the questions. This is of great importance when attention is to be called by individual correspondence or in a general way to particular points. At present, we are emphasizing through circular letters and print, the importance of correctly answering questions six and nine, which relate to legitimacy and the mailing address of the parents.

2. To protect our own space for file numbers from local registrars, we have clearly indicated by boxing the space and by direct admonition, that it is for "State Registrar only." At the same time, we point out to them by an underline, the space that is reserved for their serial registered numbers. This arrangement, at the same time, throws the heading of the certificate to the center, thus giving the top of the blank a more balanced appearance.

3. We have discarded one of the Registration District No. spaces, intended for use when the registrar has two registration districts. We found that no feature of our first form, which we adopted from other states, was more generally misunderstood, or called for more patient explanation to literally hundreds of local registrars, than those perplexing spaces.

4. In question 1, as to place, we simply changed the word "Township" to our term "District," and substituted "Incorporated town of" for "Village of," to suit our needs. Those flexible changes, of course, can be made as required. An underline note, requesting the name of hospital or institution, rather than the street and number, brings more accurate information as to the place of birth.

5. The need for the term "Boy or Girl," instead of "Sex," was made apparent to me when remonstrating with a colored midwife for always omitting the answer to that essential question. When I discovered that she did not know the meaning of the word *sex*, I endeavored to make it plain by telling her that we wished to know whether the child was male or female. Her puzzled look still proved that my language was not sufficiently simple. I then asked, in reference to the certificate in hand, "Was the child a boy or a girl?" The question brought a ready response, and that became the accepted form for the question as to sex.

6. Questions 4 and 5, of this old form, have been the greatest stumbling block for midwives, physicians and local registrars, seeming to be equally puzzling to all classes. Many of our old certificates contain the word "Other," in answer to question 4, to inform us that the child was neither twin, triplet nor yet quadruplet. We, therefore, ask only whether the child is one of twins or triplets, taking chances on getting the information in rare quadruple or other births. Our

chief trouble, however, was to prevent the insertion of the answers to questions 20 and 21 in those spaces. The insertion of the words, "twins or triplets," in the place of the, to the midwives, unknown word, "plural," has been of some value, but even our marginal attempt at explaining the purpose of questions 4 and 5 have not met with entire success in always securing proper answers to those questions.

7. We have endeavored also to make more clear the desire for the use of a separate report for each child in plural births, by rewording the marginal instructions and substituting the word "blank," which seems more easily understood, for "return." We are still getting some twin births reported on one blank, because doctors, midwives and local registrars will not read the marginal instructions, and hope only by continuous correspondence and advertisement to impress upon all that such certificates constitute a report of neither birth. The loss of fifty cents in fees is our strongest aid in impressing the point upon the local registrars, at least.

8. The hundreds of blank spaces and irrelevant answers to question 6 in our old certificates, demonstrates that the term, "Legitimate" is entirely incomprehensible to the infantile intellects of our host of grannies, who hold in their dirt-laden hands the lives of thousands of mothers and infants. While we are getting many more replies since the substitution of the question, "Are parents married?" yet I am satisfied that our sisters in black still consider that matter one of minor importance, either way.

9. The men who imagine themselves so busy they they cannot take time to write the name of the month, we find are very apt to give the wrong figure when they endeavor to number rather than name it, in writing the date. We, therefore, in question 7, ask for the name of month, and follow up the request in a short set of rules for local registrars on the monthly report cards.

10. The Virginia Health Department desires to mail a bulletin on the care of the child to the parents of each legitimate infant reported. Our Bureau also sends a pink "birth-card," announcing that "the birth of a son is properly recorded in the Archives of the State," and a blue card, if the child is a daughter. These can be sent only when the mailing address of the father is given in question 9. They are sent only to those parents, also who are stated positively to be married, in question 6. In the early months of our work, from ten to ninety per cent., by counties, could not receive the bulletin or card, because of lack of accurate information as to legitimacy and mailing address. The inquiry as to *residence*, in the accepted standard form, usually secures the street address in cities, but is apt to be answered by the name of the county or state in rural sections. We, therefore, ask for the *postoffice*, which in the country is a more generally understood term than *mailing address*, and are now rarely failing to receive a correct answer. We consider the changed form of those two questions, 6 and 9, the most important of our recommendations.

11. Formerly, in answer to the inquiry as to *color*, we got numerous replies, such as "brunette," "blond,"

"light skinned," "dark," etc. The change to *Color* or *Race*, in questions 10 and 16, are preventing many replies of that character. I am not sure, however, that the word, "race," is sufficiently well understood, but with the joint use of the two terms, results are satisfactory. We thus learn also as to Indian, Japanese, Chinese, etc.

12. Question 14, in which the old form, which asks for the mother's "full maiden name," seems perfectly clear and simple. Experience teaches us, however, that in a large per cent. of replies the mother's given name, together with her marriage name, are given. We now ask in clearer terms for her "Name before marriage," and are failing in fewer cases to get the desired information, which in the future may be an important part of the record.

13. The next change occurs in question 21, and serves to make clear that we desire the birth being reported to be included in the number of the mother's living children. The change is simply a continuation of the form as given in question 20, but the sentences are printed as two lines, instead of one, each, owing to increased length.

14. In question 22 our underlined note serves to make clearer the meaning as to the hour a. m. or p. m.

15. Many local registrars and others make out certificates for illiterate midwives and sign their names without explanation, though they may be present. To make the signature legal, we have introduced the new space 26 for the local registrar, or other person, to sign in, as witness to the midwife's mark, which we ask for. This additional line necessitates a rearrangement of questions 24 and 25, by placing them on the same line. I consider this an important change, both from its possible legal bearing and to impress upon local registrars that the supposed signatures of others are not to be lightly affixed to certificates.

16. Our change of the explanatory note from its former position to that of a foot-note, renders the certificate less crowded, and brings the note itself out more prominently. It also permits us space to answer a question frequently asked, as to the period of utero-gestation, to be considered worthy a report. That of five months seems to have become by usage the accepted period.

We believe that our definition of a still-birth is more positive for the midwife than that on the accepted form. We say, "If a child breathes even once, it must not be reported as stillborn." The physician who detects a heart-beat is not prevented from considering the child a living birth, even though he sees no respiratory effort, while the midwife will never go further than to observe, as to respiration.

The space left vacant by change of location of the foot-note may be used for another question, if any city or state desires to ask, as to the use of nitrate of silver, educational attainments of parents, etc.

To prevent the writing of "unnamed," "baby not named," etc., in question 2, instead of the name, thus making it difficult afterwards to fill in the name from a supplemental report, an underline note might be included as follows: "If the child is not named, leave this space blank for future use."

THE ACTION OF CERTAIN BACTERIA ON THE NITROGENOUS MATERIAL OF SEWAGE.

E. G. Birge, M. D.,
Instructor in Preventive Medicine and Hygiene, Harvard Medical School.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

THE bio-chemical work which has been done on sewage in the past has been confined almost entirely to the changes taking place in the various forms of filter beds in use at the present time. While we have considerable information concerning the bacterial action in the filter bed, our knowledge of this action in the septic tank is in a more chaotic state. What little we know is the mass action of all of those organisms, bacterial and otherwise, which play a rôle in the preparation of sewage for further treatment.

The primary object of this paper, which must be considered as a preliminary work, was to determine what the individual species of bacteria do chemically when allowed to act on sewage in pure cultures or symbiotically. It was hoped that something could be shown which would justify us in attempting to control the bacterial flora in large masses of sewage under treatment. It was expected that the results would enable us to say what we might expect if certain groups or species of bacteria proved to be present in predominant numbers.

It is reasonable to assume that mere numbers of microörganisms do not guarantee any definite chemical action. It is only when certain groups or species are predominant that a definite chemical change may be predicted or expected. At the present time we can make no prediction of this kind, because it is not known what group or groups of bacteria are responsible for those changes which are accepted as desirable.

In the past, work on putrefaction and decomposition has been confined largely to the study of the nitrogenous material, although there are certain other cycles, which as Fuller* points out must be quite as carefully studied. In conformity with past work along this line, it was decided to study the nitrogen cycle in relation to the changes taking place in the septic tank rather than the filter bed.

Clark† in his report on a somewhat similar investigation done at the Lawrence Experiment Station in Massachusetts, points out that there are five lines of action, *i. e.*, putrefaction, nitrification, denitrification, nitrogen liberation and nitrogen fixation. While undoubtedly all five of the processes go on simultaneously, the process which predominates depends entirely upon conditions present. His work was done in connection with the nitrification in filter beds, but it is reasonable to suppose that the same thing would hold true for septic tanks, except that the conditions are such, usually, that the putrefactive action is more likely to predominate, especially in the one-story type of tank.

* Fuller: Sewage Disposal, page 47.

† Clark; Report of the Mass. State Board of Health, 1904, page 244.

At the beginning of the work it was assumed that the ideal change in composition would be an increase in the free ammonia content, and a corresponding decrease in those decomposition products represented by the organic nitrogen, with little or no change in either the nitrites or nitrates should any be present. In order to bring about a conservation of the higher oxidation products of nitrogen, it is essential that sufficient oxygen be present so that the microörganism is not forced to reduce these substances to support life. I believe that at the present time it is considered wise to have as much residual oxygen as possible in the septic tank. I found, as I will point out later, that the action of certain bacteria, in fact nearly all of the particular species studied, was much more dependable under aërobic than anaërobic conditions.

Methods.

The methods may be criticised because it is impossible to simulate natural conditions in a laboratory experiment on a small scale.

In order to use sewage as a culture medium it is necessary to sterilize it, and any method of sterilization changes the chemical composition of the sample. It is therefore necessary to select that method which produces the minimum change.

Chemical methods are naturally out of the question, because of their ineffectiveness in bringing about complete sterility without a great excess of the chemical, which would have an inhibiting action on the bacteria subsequently added. This incomplete sterilization by chemical means has been shown by Lederer and Hommon* in their paper before this association at the meeting of 1910.

If the gross solid material is filtered out, the sewage can be sterilized by heat, practically without affecting the chemical composition.

While there is a difference in composition between the unsterilized and sterilized sewage, the differences in the flasks of sterilized sewage made up from the same large sample are so slight as to be negligible.

The sample of sewage was filtered through cotton to remove the gross solid material, made up into liter lots and sterilized at 120° C. (15 pounds pressure) in the autoclave for 45 minutes. Two sets of flasks were made up at a time for each series, one set was treated with paraffin oil to give anaërobic conditions; the other set was left without the oil to favor aërobic conditions. In each set there was one flask which acted as a control. The changes in those flasks which were inoculated with bacteria were measured against this control, after making allowances for the difference in composition and errors in the methods.

In connection with the dissolved oxygen content, the preliminary work brought out several interesting facts. It was found that the heat of sterilization would in itself drive off the greater amount of dissolved oxygen, and that the flasks which were not treated with paraffin oil would pick up oxygen rapidly, even at the temperature of the incubator, 37.5° C. On the other hand, those which had been treated with paraffin oil continually

* Lederer and Hommon; *Jour. Am. Public Health Association*, Vol. 1, (New Series), 1911, p. 267.

lost what little dissolved oxygen there was left. There is no doubt but that the unsaturated hydrocarbons of the oil extracted the dissolved oxygen, and did it so rapidly that at the end of twenty-four hours there was, for all practical purposes, none left.

The flasks were inoculated twenty-four hours after sterilization with one cc. of a twenty-four hour bouillon culture of the bacteria to be studied, and incubated at 37.5° C. for twenty-four hours. They were then analyzed for free ammonia, organic nitrogen, nitrites and nitrates according to the Standard Methods for Sewage Analysis.

Sewage.

The sewage was obtained from the Ward Street Pumping Station of the Metropolitan System of Boston, and was typical of an average domestic sewage. The district served by this pumping station is mainly residential, there was probably a small amount of manufacturing wastes and some storm water. Care was taken to obtain the samples at the same time of day, so that the sewage would have a similar composition throughout the work.

Bacteria.

The bacteria chosen for the work were not isolated from the sewage itself. It was thought better to use bacteria of known stock, typical of those groups which are normally found in sewage. For this reason, B. coli communis; B. cloacæ; B. pyocyaneus; B. proteus vulgarus, B. mesentericus ruber and B. subtilis were selected. All of these have either been reported as having been isolated from or are representative of groups normally occurring in sewage.

The bio-chemistry of these bacteria, when grown on artificial media, shows that they possess characteristics which, theoretically, at least, should be of value in breaking down a complex organic substance such as sewage. The only exception to this statement is possibly the power of B. coli to reduce nitrates. It will also be recalled that all of them are facultative anaërobes.

The action of the bacteria when grown symbiotically brought out two very interesting points. One was the behavior of B. coli. Invariably in the anaërobic flasks it was completely overgrown in the twenty-four hour period. Under aërobic conditions it overgrew B. pyocyaneus, but was overgrown by the other bacteria.

The other fact was that B. proteus vulgarus and B. subtilis overgrew the other bacteria in the proportion of three to one under all conditions. When these two were grown together they about balanced each other at the end of the twenty-four hour period.

The Action of Pure Cultures.

The action of pure cultures was studied under two conditions of temperature, at 37.5 ° C. and at room temperature. A summary of the results follow:

B. coli.—There was a marked tendency to decrease the nitrites and nitrates, with a very decided decrease in the organic nitrogen. This was more marked in the anaërobic than the aërobic flasks, and was much more vigorous at 37.5 ° C. There was very

little action on the free ammonia, the general tendency being to decrease it.

It was noted that the correction for the amount of organic nitrogen added to the samples in the bouillon, tended to give, in all of the experiments, a reduction of the organic nitrogen. This was studied in the hope that some intermediate decomposition products might be found to account for it. At the present time I am unable to explain it in any other way than that the standard methods may tend to give results too low, and that possibly some of the nitrogen is liberated.

B. cloacæ.—In general it may be said that this microörganism did not materially differ from B. coli. The greatest action was on the nitrites and nitrates, which were decreased markedly in both the anaërobic and aërobic flasks. There was also a decided tendency to decrease the amount of free ammonia. This was not constant.

B. pyocyaneus.—At 37.5° C. the action was irregular. At times the nitrites and nitrates were increased and under apparently the same conditions they were decreased. The same holds true for the free ammonia and organic nitrogen. There was nothing to indicate that the oxygen content of the samples had any effect on the action.

At room temperature the action on the free ammonia and organic nitrogen had the same irregular tendencies that were noted above.

This irregularity was also noted in the aërobic flasks in connection with the nitrites and nitrates. In the anaërobic flasks the nitrates were decreased with an increase in the nitrites. This increase and decrease nearly balanced.

B. proteus vulgarus.—This also showed a marked irregularity in its action at 37.5 ° C. At room temperature the action was more constant, the free ammonia being increased with a corresponding decrease in the organic nitrogen. The nitrates were increased with a corresponding decrease in the nitrites. This activity was more marked in the anaërobic than in the aërobic flasks, and I believe that with this microörganism, better results can be obtained under anaërobic, or nearly anaërobic conditions, than where the oxygen content is relatively high.

B. mesentericus ruber.—This has nearly the same characteristics as the previous microörganism, the action being irregular in the experiments conducted at 37.5° C., while even those at room temperature were more constant, especially under anaërobic conditions. At the lower temperature the free ammonia was increased and the organic nitrogen was decreased. The nitrites were, in the majority of the experiments, increased, with no changes in the nitrates. Under aërobic conditions at room temperature, both the nitrites and nitrates were increased, while the organic nitrogen was decreased. These changes did not balance, leaving a large deficit in the organic nitrogen which has not been satisfactorily accounted for.

B. subtilis.—This microörganism gave really consistent results. These were obtained under aërobic conditions and confined themselves to the free ammonia and the organic nitrogen. There was in all of the experiments an in-

crease in the free ammonia with a decrease in the organic nitrogen that practically balanced it. This activity was relatively very great, amounting to as much as eight parts per million at 37.5° C., and two parts per million at room temperature. In regard to the nitrites and nitrates, the tendency was more often to decrease than to increase them. The action was not constant.

Under anaërobic conditions the action of the bacteria was regular at 37.5° C., both the free ammonia and organic nitrogen being decidedly decreased with an increase in the nitrites and nitrates, the latter being very decided. At room temperature the action was not so marked and in general followed that of the aërobic conditions, showing an increase in the free ammonia and a decrease in the organic nitrogen.

From the results which were obtained, I believe that this microörganism and the entire group of allied bacteria will bear much careful study in their relation to the bacterial processes in the purification of sewage.

The Action in Symbiotic Growth

I have already pointed out that in symbiotic growth B. coli was completely overgrown in the anaërobic flasks, and was overgrown by all of the bacteria in the aërobic flasks, with the exception of B. pyocyaneus. Also that B. subtilis and B. proteus vulgarus overgrew the other bacteria in both sets of flasks. When grown together they about balanced each other.

Chemically the fact that the action very closely followed the predominating bacteria was extremely interesting. The action was in certain cases, as I will point out later, very different in the aërobic and anaërobic flasks with the same bacteria. This difference was particularly noticeable when B. subtilis and B. coli were grown with other bacteria.

Although the action of the symbiant was at times apparent, the time of incubation was in some cases evidently too short for the predominating bacteria to manifest itself chemically. This was plainly evident where more than two bacteria were inoculated into one flask. In these cases also it is to be noted that B. coli dropped out of sight in twenty-four hours in both sets of flasks. In those flasks where all of the bacteria were grown together the overgrowth of B. proteus vulgarus and B. subtilis was apparent, but it was not sufficient to markedly affect the chemical results.

A summary of the results follow:

B. coli and B. cloacæ.—I have pointed out previously that these two organisms have almost the same action on sewage. The results when grown together are quite different from what might be expected, especially in the aërobic flasks. Here the free ammonia was increased with a corresponding decrease in the organic nitrogen. The nitrites were also decreased. No changes were noted in the nitrate content. Apparently the presence of B. coli was a decided advantage in the early part of the incubation period, since it was greatly overgrown in twenty-four hours.

The overgrowth in the anaërobic flasks was probably much quicker

than in the aërobic flasks, and was much more complete. The chemical changes noted in this set of flasks are those of a pure culture of B. cloacæ. The only exception being that neither the nitrites or nitrates were attacked.

B. coli and B. mesentericus ruber.—The changes here are those due almost entirely to B. mesentericus ruber, especially in the anaërobic flasks.

In the aërobic flasks the small number of B. coli present affected the results so that they were very irregular.

B. coli and B. pyocyaneus.—In spite of the fact that B. coli overgrew B. pyocyaneus there were no changes which could be attributed to either microörganism. Evidently B. coli established itself so late in the incubation period that the little chemical effect it might have had was not apparent.

B. coli and B. proteus vulgarus.—In pure culture both of these bacteria had a slight and irregular chemical action; however, when grown symbiotically the changes in composition were regular and consistent. Under both aërobic and anaërobic conditions there was an increase in the free ammonia and a decrease in the organic nitrogen. No changes were noted in either the nitrites or nitrates.

B. coli and B. subtilis.—Under aërobic conditions the changes were those of a pure culture of B. subtilis, *i. e.*, an increase in the free ammonia and a corresponding decrease in the organic nitrogen. Except in one case where there was a slight increase in the nitrites, neither the nitrites or nitrates showed any change.

As I have noted, neither of the bacteria have a regular chemical action at 37.5° C. under anaërobic conditions. However, when grown symbiotically there is an increase in the free ammonia and a decided decrease in the organic nitrogen. This increase and decrease balanced each other.

Neither the nitrites or nitrates were affected in any way.

Just what the explanation for this condition is, I am unable to say at the present time, as B. coli was completely overgrown.

B. subtilis and B. cloacæ.—In the aërobic flasks, in which B. subtilis markedly overgrew B. cloacæ, the chemical changes were typical of B. subtilis. The free ammonia was increased with a corresponding decrease in the organic nitrogen.

The nitrates were decreased with an increase in the nitrites.

Under anaërobic conditions where the overgrowth of B. subtilis was not apparent, the chemical changes were in the main those of B. cloacæ, differing from those of the pure culture in the tendency towards increasing the nitrites and nitrates.

B. subtilis and B. mesentericus ruber.—In the aërobic flasks the action was irregular, resembling that of B. mesentericus ruber. Both the nitrites and nitrates were increased.

In the anaërobic flasks the free ammonia was increased with a corresponding decrease in the organic nitrogen and nitrites. The nitrates were unaffected. This, except for the decrease in the nitrites, follows very closely what was found under similar

conditions for B. mesentericus ruber in pure cultures. The cultures, however, showed a considerable overgrowth of B. subtilis.

B. subtilis and B. pyocyaneus.—Under aërobic and anaërobic conditions the bacteria grew practically equally.

In the aërobic flasks the free ammonia and the organic nitrogen were decreased, while the nitrites and nitrates were both increased.

Under anaërobic conditions the free ammonia was increased with a decrease in the organic nitrogen and nitrites. The nitrates were unaffected.

B. cloacæ and B. mesentericus ruber.—B. mesentericus ruber overgrew B. cloacæ in both sets of flasks.

Under aërobic conditions the chemical action was more irregular than was found for B. mesentericus ruber in pure culture, but in general coincided very closely to it. The most marked effect was on the nitrites and nitrates. The nitrates were decreased with an increase in the nitrites.

In the anaërobic flasks the action was much more typical of B. mesentericus ruber, the free ammonia being increased with a decrease in the organic nitrogen.

The nitrates were decreased and the nitrites increased.

B. cloacæ and B. proteus vulgarus.—The action of these bacteria was very irregular and typical of neither. This was true for both aërobic and anaërobic conditions.

The nitrites were generally increased.

In one experiment all of the nitrogen was reduced in amount.

B. proteus vulgarus and B. mesentericus ruber.—Under aërobic conditions the action followed that obtained with B. mesentericus ruber. The free ammonia was increased and the organic nitrogen was decreased correspondingly.

In the anaërobic flasks the tendency was to decrease both the free ammonia and the organic nitrogen, while the nitrites and nitrates were increased. These results follow those obtained from B. proteus vulgarus more closely than B. mesentericus ruber.

The cultures showed a slight overgrowth of B. proteus vulgarus in the anaërobic flasks.

B. pyocyaneus and B. proteus vulgarus; B. pyocyaneus and B. mesentericus ruber.—Neither of these gave any results under either aërobic or anaërobic conditions.

The chemical results in those experiments in which four of the bacteria were inoculated into one flask were very irregular and disappointing. The time of incubation was apparently insufficient for any one or two bacteria to establish themselves sufficiently to affect the chemical composition of the sewage.

In the experiments in which all of the bacteria were inoculated into one flask there was but one change worthy of note. That was the increase of the nitrates in all of the experiments. This was found under both aërobic and anaërobic conditions, amounting in one instance to six parts per million. There was a decided decrease in the rest of the nitrogen present.

Summary and Conclusions.

Certain bacteria have been studied to determine their effect upon sewage. Those selected were B. coli communis, B. cloacæ; B. pyocyaneus, B. proteus vulgarus, B. mesentericus ruber and B. subtilis. They were selected because they represent aërobic types which are found frequently or constantly in sewage. The effects of these bacteria were studied in fresh sewage, filtered and sterilized by heat at 120° C. (15 pounds pressure) for forty-five minutes. They were studied under aërobic and anaërobic conditions, also in pure cultures and in symbiosis. Particular attention was paid to the effects on free ammonia, organic nitrogen, nitrites and nitrates.

Bacteriologically it was shown that B. coli was completely overgrown under anaërobic conditions in the twenty-four hour period. Under aërobic conditions it was able to overgrow B. pyocyaneus, but was overgrown by the rest of the bacteria studied.

When grown in pure cultures, with the exception of B. proteus vulgarus, the bacteria gave more constant results under aërobic than anaërobic conditions.

B. subtilis showed a marked ammonifying power throughout the work under aërobic conditions. Under anaërobic conditions it regularly decreased the free ammonia and organic nitrogen content, increasing the nitrites and nitrates, especially the latter.

B. coli and B. cloacæ had a decided reducing action on both the nitrites and nitrates. Under some conditions, as yet undetermined, they reduced the free ammonia content also.

B. proteus vulgarus had a considerable ammonifying power under anaërobic conditions. This was very slight under aërobic conditions and was more constant at room temperature than at 37.5° C.

The action of B. pyocyaneus and B. mesentericus ruber was irregular under both aërobic and anaërobic conditions.

The experiments in symbiosis showed that the chemical changes followed very closely those of the predominant bacteria in pure culture. Those experiments which did not follow this rule, and in which there was a decided predominance of one microörganism showed that the bacteria had become predominant too late in the incubation period to affect a marked chemical change.

B. coli and B. cloacæ; B. coli and B. proteus vulgarus gave more constant results when grown symbiotically than when grown in pure culture. These were the only instances of an apparently true symbiotic growth.

The results of the experiments, in which more than two bacteria were grown symbiotically, showed that the incubation period, twenty-four hours, was too short to allow any one microörganism or any group of bacteria to establish itself chemically.

The work has shown that we will be able to predict what the changes in the chemical composition of sewage are going to be if a group or species of bacteria are predominant.

The results of this work would certainly not justify us in attempting

to control the bacterial flora of the septic tank. However, I am strongly convinced that in the future this course may be justified.

The results obtained from B. subtilis should again be emphasized. Everything indicates that this micro-organism may be made to play a most important rôle in the treatment of sewage.

THE PREPARATION OF AMMONIA-FREE WATER.

EDWARD J. PUGH,
Thomas A. Scott Fellow; Laboratory of Hygiene; University of Pennsylvania.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December, 1914.

IN THE ordinary course of water analysis, ammonia-free water must be prepared by distilling water and rejecting the first portion which contains most of the ammonia. With a new apparatus or one which has not been used for some time it frequently takes several hours of distilling to drive the last traces of ammonia out of the condenser. This tiresome process must be repeated each time ammonia-free water is wanted unless the still is run continuously. The experiments mentioned in this paper were made in order to try to obviate this difficulty by precipitating the ammonia.

Nessler's solution was made according to the formula given in the Standard Methods of the American Public Health Association.

Ammonia-free water for comparison was made by distilling Philadelphia tap water; rejecting the first third and redistilling after adding a few drops of sulphuric acid to hold back traces of ammonia.

The author intended to form some precipitate in the water after adding Nessler's reagent and try to precipitate the ammonia by mass action.

The most satisfactory results were obtained by adding 40 cc. of Nessler's solution to the tap water and then adding an emulsion of alumina cream until a permanent flocculent precipitate remained on shaking. It was then allowed to settle for half an hour and filtered through a wad of asbestos wedged into the stem of a large funnel. The first third of the filtrate is generally cloudy and must be refiltered by pouring it back onto the same filter; as the pores of a filter must become clogged before a clear filtrate can be obtained. The asbestos must be ignited to remove all traces of ammonia. Since the water obtained by this process already contains the proper amount of Nessler's solution it is not necessary to add any. In making up color standards definite portions of ammonium chloride are added to the ammonia-free water in long 50 cc. Nessler tubes and mixed by pouring from one tube to another. The standards prepared in this manner are as clear as those prepared from water which has been freed from ammonia by distillation and will keep about the same length of time without precipitating. They have a slightly different color but this is not noticeable unless large amounts of ammonia are present. This objection, however, is not very great since solutions containing large amounts of ammonia should always be diluted before matching colors. Theoretically the process should be cheaper than the distillation process since no gas is used for heating the water. I still have some of the water I prepared

about two months ago and it is just as good now as when it was first prepared.

Experiments were made to determine the feasibility of filtering through alundum by suction but the filtrate was always cloudy and had a slight color due to the presence of iron. Filterpaper or cotton cannot be washed free from ammonia very easily and consequently are unsatisfactory.

It was thought that good results might be obtained by adding alum or aluminum sulphate to the water containing Nessler's solution and forming the precipitate in the solution but the results were not altogether satisfactory. It seems as if large amounts of sulphates interfere with the reaction.

Ferric chloride and ferric hydroxide were tried in place of the aluminum but traces of iron always remained in solution and were sufficient to give a color to the filtrate. Mercuric chloride will carry down the color if very small amounts of ammonia are present but will not precipitate all of it if there is much present. Mercuric iodide continues to crystallize out of the solution for several days so that the solution should stand some time before filtration or else be filtered again. Even under the best conditions mercuric chloride does not remove the color as well as the aluminum hydroxide. In water containing much mineral matter sodium carbonate seems to precipitate out most of the ammonia along with some of the inorganic matter, but at the same time desensitizes the Nessler's solution so that more must be added in order to give a color with ammonia.

The conclusion is that ammonia-free water can be prepared quickly and cheaply by adding aluminum hydroxide to water containing Nessler's solution.

REPORT OF THE COMMITTEE ON INDUSTRIAL HYGIENE AND SANITATION OF THE HOME.

Dr. John H. Landis,
City Health Officer, Cincinnati, Chairman.

Read before the Public Health Officials Section, the American Public Health Association, Jacksonville, Fla., December 2, 1914.

IN THE 1913 report of this Committee, attention was directed to the work of the Sanitarians of Organized Labor, an organization including delegates from the labor unions of Cincinnati and representatives from the local health department.

Meetings are held twice each month on Sunday morning and are well attended. In addition to the educational value they possess, the following is a brief summary of work accomplished during the year ending August, 1914.

Seventy-two insanitary conditions in workshops and factories, of a general character calling attention to bad toilets, faulty plumbing, common drinking cups, dry sweeping, improper and inadequate ventilation, spitting on the floor, etc., were reported. Insanitary conditions in dwellings were reported in twenty instances; overcrowding in tenements, four; outside privy vaults, thirty-two; dangerous cisterns, six; and catch basins, four. Under the head of miscellaneous conditions, such as uncovered manure boxes, dumps, ravines, stagnant pools, uncollected garbage and ashes, filthy chicken coops, dirty floors and lack of cuspidors and filthy toilets in public places, were reported and investigated.

In all, one hundred and eighty-one complaints were cleared through the Sanitarians of Organized Labor. Twenty-four lectures were given before the unions by speakers furnished through the health department in coöperation with the Academy of Medicine.

Through complaints received from the Painters' Union, the United States Government detailed Dr. Alice Hamilton to investigate the hygiene of the painters' trade in Cincinnati.

It is not to be assumed that industrial hygiene is being handled adequately by this organization. Its main object is to eliminate conditions in workshops and factories which are recognized as predisposing factors in the development of tuberculosis. Reports on bad conditions outside of these places are solicited, every precaution being taken in all instances to suppress the source of the information received.

It is recognized that while our work does accomplish a little in correcting bad conditions, the chief benefit is derived from its educational influence. Men become familiar with danger signals and are on the lookout for them.

In the majority of the states, industrial hygiene is under the control of workshop and factory inspectors who may or may not know just what are their duties. Too often appointments are a reward for political services

rendered. Many of the appointees have the same comprehensive knowledge of a blower system that the average man has of the fourth dimension. We get what the general level of intelligence is entitled to, and that almost invariably means "the short end." Some of the great corporations are doing an immense amount of good in their "safety first" campaigns. The vast majority of employers, however, have not yet learned that defective working units make a heavy drain on output and earnings.

Industrial hygiene must be approached from two angles to correct faulty conditions. The worker must be shown the danger to his life and health, and the employer, the money waste due to the resultant lowered efficiency. When workers in industrial hygiene become discouraged over the slowness with which results are obtained, it is wise to take stock. They will be surprised at the immense strides that have been made in the course of a few years.

At present the State Board of Health and the United States Public Health Service are engaged in surveys in Cincinnati that should be of great benefit to industrial hygiene in that city. The state is studying industrial diseases, and the federal government is making a comprehensive survey of the tuberculosis situation with special reference to those trades which show an abnormal prevalence of tuberculosis among its workers.

In Cincinnati, the board of health is working for an appropriation that will permit us to place one man, a physician, on full time in the epidemiological study of tuberculosis and two other physicians on full time in industrial hygiene. It is believed that this will be a much more satisfactory way of solving a difficult problem. As all appointments are made through the civil service, it insures the elimination of abuses which inevitably accompany political control.

What is needed is not more laws, but an intelligent enforcement of those already written and the dissemination of the knowledge that their enforcement will benefit both capital and labor.

Attempts to improve sanitary conditions in the home have only a transient influence when expended on the domicile itself. In the vast majority of instances, people create their own environment. An insanitary home is one of the effects of causes placed in operation long before the final effect is observed. It must be perfectly obvious that efforts expended wholly and solely on end results can have no influence on the causative factors. While a comprehensive clean-up is a good thing, it bears about the same relationship to a permanent clean-up that hospital care of typhoid fever patients does to eradicating the sources of that disease.

An insanitary home is usually a symptom of something radically wrong outside the home.

The problem grows greater from year to year, because the interests active in manufacturing end results create vicious circles which perpetuate themselves.

Newly arrived immigrants add to the problem, because old world ideas of

economy bring them in close contact with vicious influences. Government supervision of these people, with compulsory educational laws, would be a form of national insurance that would do much to solve the problem.

Three hours a week in a night school would, in the course of several years, make American citizens out of these people one generation in advance of the time now required. It would mean a citizenship based on intelligence, not merely on so many years of residence. It would have an enormous influence in curtailing disease, poverty and crime, and would winnow out those undesirables who should be deported for the public good.

Anyone who imagines that our present method of handling aliens is perfect, will quickly revise his ideas if he will visit, in turn, a police court, refuge home, general hospital, and other charitable and correctional institutions.

To those apprehensive souls who see in every attempt at creating a better citizenship, a subtle attack on "personal liberty," it may be pointed out that native Americans have the first say in determining the quality of citizenship in this country and that they have an inalienable right to do whatever is necessary to insure self preservation.

Great good is being done through school inspectors, nurses, and social workers to improve home conditions, but their efforts merely scratch the surface. The bulk of what is being done now is curative when it should be preventive. No sanitary problem is solved quickly or permanently by caring for its victims.

Discussion.

Dr. Hayhurst (*of the Ohio State Board of Health*): Among some of the first things that have to be settled in relation to this question of industrial hygiene and occupational diseases is the establishment of a set of standards for industrial health tests. We have got to be able to go into a place when we investigate it, with a definite idea of what is the standard in relation to ventilation, to light, to the amount of dust that may be in the atmosphere for a given length of time; what is the standard for the amount of poisons, poisonous fumes or vapors, according to the different kinds to which a person may be subjected during a certain period? In the state of Ohio we have been attempting in the last two years to make a survey of industrial hygiene as the fundamental cause behind occupational diseases and attempted to apply ten different health hazards to every working department in which we have found men employed, and have attempted to grade those health hazards as good, fair or bad. The report of that will be published within the next six weeks or so, as nearly as we have been able to get at it. Our worst drawback has been the lack of some standard upon which to base opinions, and that is the controversy every time when it comes to directions. It also has seemed to me that for a large class of working people, particularly our foreigners, the place to attack social delinquency is right at the work place. If those men are set examples of insanitary conditions, faulty hygiene, for ten or twelve hours of the day when they are awake at their work places, we cannot expect them to do any better at their homes and in their habits.

The report of the Committee was adopted.

REPORT OF COMMITTEE ON OCCUPATIONAL MORTALITY.

DR. W. F. SNOW, *Chairman.*

Read before the Vital Statistics Section of the American Public Health Association, Jacksonville, Fla., December 3, 1914.

IN PRESENTING its report for consideration the Committee desires at the outset to define the field of inquiry which it believes should be covered. The Section on Vital Statistics has generally been recognized as dealing with deaths, births, and marriages. In a study of occupational mortality the Committee believes it essential to include morbidity as related to occupation. A study of economic conditions and the slow working changes of physical and mental deterioration—the health-hazards—due to occupational requirements and environment are essential to a profitable study of the problem, and these data can be obtained with completeness only during the lifetime of the patients. The Committee also believes that the possible application of studies in occupational mortality should be steadily borne in mind and has therefore included brief reference to needed legislative and administrative measures which demand serious consideration by public authorities and private agencies.

Accordingly, as a basis for its discussions, the Committee has assumed that the field of inquiry covered not only occupational mortality, but also morbidity and certain predisposing factors. Death is the culmination of a process. Deaths from occupational diseases are preceded by longer or shorter periods of illness. These deaths are largely preventable, and can be so prevented only by closely studying the cases before their fatal termination. There are, first, the deaths resulting from industrial accidents; second, there are deaths resulting from so-called occupational poisonings of which lead poisoning, arsenic poisoning, mercurial poisoning are illustrations; third, there are the occupational infections such as anthrax, tetanus, and possibly hookworm among miners, and the occupational traumas due to extreme alternation of the physical conditions under which the normal physiological operations of the body are carried on—caisson disease being an illustration; and finally there are the deaths, perhaps most important of all, which result from conditions of a more diffuse character. In this last group the conditions resulting in death are general, complicated, and often insidious in character. The occupation in these cases aggravates the morbid conditions which commonly affect large numbers of the population.

"Pulmonary tuberculosis" may be taken as an illustration of this fourth group. This is an occupational disease from this point of view, for quarrymen, certain groups of the textile workers, garment workers, and others. The figures that are now available point out distinctly that these groups

show higher mortality rates for the working periods of life than do corresponding age groups of all occupied persons of the same sex. On further analysis the higher mortality can be traced to a higher incidence of "pulmonary tuberculosis." This is so constant over long periods of time and in different countries that we cannot escape the conclusion that the particular kind of work done by these groups carries with it a higher incidence of tuberculosis.

What is thus indicated to be true of tuberculosis is probably true in varying degrees of a number of other diseases. Increased knowledge of our occupational stress on life and health is our chief desideratum at this time. We must have the facts with regard to occupational mortality and morbidity in this wider sense.

To obtain these facts the Committee recommends the intensive study of local problems in this field presented by the chief occupations of each community. The health departments, with their vital statistics and inspection equipment, in coöperation with other public and volunteer agencies, have a great opportunity to do this. The living conditions, age, occupational environment, character of illnesses being treated by the local physicians, evidence of physical deterioration during service, the mortality—are all factors requiring accurate tabulation and comparison. The full reporting of occupational data for all deaths needs constant emphasis. The practicability of collecting this information has been demonstrated by such investigations as Doctor Schereschewsky's study of garment workers, Doctor Hayhurst's work with lead workers and potters in Chicago and Ohio, Doctor Goldwater's investigations of New York City employees and licensed peddlers, Doctor Hansen's work in Massachusetts, Doctor Sachs' work in Chicago, Doctor Tucker's study on cement workers, and the many other observations of workers in textile mills and various trades.

In addition to intensive studies in recognized industrial centers, there is need for state and municipal departments systematically tabulating the data relating to a selected group of diseases: for example, tuberculosis, chronic nephritis, organic heart disease, and rheumatism. This information collected for all parts of the United States and preserved with the best obtainable occupation data would be a valuable aid in ultimately obtaining a series of death-rates for the important diseases in which occupation is a major factor.

The Committee has included for purposes of discussion two tables:—

I. Occupation classification for practical studies of occupational mortality and morbidity.

II. Selected causes of death for tabulations in studies of occupational mortality.

These tables have been worked out by Dr. Louis I. Dublin after careful studies of occupation as a factor in all the diseases and deaths included in the international classification. The Committee suggests the possibility of dividing this group among the several states and thus planning correlated studies during the coming year, covering practically the whole list. For

example, certain states could supplement the work of the Massachusetts State Boards in studying physical deterioration due to occupation; others could supplement the study of occupations involving metallic poisoning and special factors brought out by the Ohio survey. It is recommended that progress reports along these lines could be published advantageously by the United States Public Health Service in its weekly Reports.

The Committee believes special efforts should be made to develop active coöperation between vital statisticians, health officers, labor commissioners, and officers of compensation boards.

The importance of liberalizing our compensation laws by including occupational diseases should be emphasized. Hand in hand with this movement should go an endeavor to popularize forms of sickness-insurance in the several states as a wise method of distributing the costs involved in any scheme for extension of compensation laws.

The members of your Committee have corresponded with investigators in this field, statisticians, and others, and the Committee considered carefully the advisability of extending this report by including quotations and data from the correspondence and information collected. Since most of the important studies of occupation in relation to morbidity and mortality have been published, and bibliographies exist, it seemed advisable to place before you only this series of suggestions for the development of future observations.

In summary these suggestions for your discussion are:—

(1) Increased emphasis on reporting of occupational morbidity and mortality to health departments.

(2) Intensive studies of local conditions in industrial centers.

(3) Interstate coöperation in limited statistical tabulation of general data collected.

(4) Development of wider coöperation among state and private agencies in the application of occupational data to illness and prevention.

(5) The working out of a standard nomenclature upon industrial processes.

In recommending its discharge the Committee suggests the inclusion of the study of occupational morbidity and mortality in the work of some standing committee of the Association, or the selection of the subject for a symposium of experts in the program of one of the sections.

Dr. John B. Andrews,
Mrs. John B. Andrews,
Dr. Louis I. Dublin,
Dr. John W. Trask,
Dr. William F. Snow, *Chairman.*

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE quarterly meeting of the Association was held at the Pemberton Inn, Hull, Mass., Thursday, July 29, 1915, under the presidency of Dr. M. J. Rosenau.

The following were elected to membership in the Association: Dr. E. Alden Dyer, 506 Washington St., Whitman; Harry C. Rice, Secretary, Board of Health, Framingham; Miss M. J. Cook, Superintendent, Melrose Hospital, Melrose; Dr. Edwin A. Locke, 311 Beacon St., Boston; David J. O'Connell, Esq., Chairman, Board of Health, North Easton; Dr. Howard A. Streeter, Chairman, Board of Health, Marblehead; Dr. Geo. T. Little, Secretary, Board of Health, Uxbridge; Mrs. Harriet Minot Laughlin, 50 Commonwealth Ave., Boston; Frank W. Murphy, 111 Pleasant St., Clinton; Robert J. Carpenter, New Kimball Bldg., North Adams; Dr. Walter W. Kingsbury, 11 High St., Malden; Dr. C. E. Prior, Chairman, Board of Health, Malden; William S. Johnson, 101 Tremont St., Boston; Andrew F. Allen, City Hall, Waltham; Charles H. Adams, Mayor of Melrose; Dr. Gharabed S. Ghazarian, 594 Tremont St., Boston; Dr. John D. Hilton, Agent, Board of Health, Swansea.

The chair announced the appointment of the following committee with regard to the following up of all cases where trouble was alleged to follow vaccination: Dr. S. H. Durgin, chairman; Dr. F. G. Wheatley, Dr. F. G. Curtis, Dr. L. A. Jones, and Mr. John Ritchie, Jr.

The following letter from Dr. R. N. Hoyt was then read.

Wellesley Hills, Mass.,
June 24, 1915.

Dr. Francis H. Slack,
Boston, Mass.

My dear Dr. Slack:

I believe there is a great need of improvement and standardization of the local health regulations in Massachusetts. I have corresponded with Dr. Eugene Kelley of the State Department of Health who states that, while his department is making a study of the subject, they fear to recommend a model set of rules and regulations on their own initiative lest local boards of health feel something is being forced on them.

Would it not be possible for a request to be sent from the Massachusetts Association of Boards of Health to the State Department, asking them to take up this work, and would it not be well to appoint a committee of the Association to assist the State Department of Health in this work?

If there is any committee of the Massachusetts Association of Boards of Health through whom this movement should be communicated, I would be glad to correspond with that committee. I should be very glad for your suggestion as to how this matter may be brought up.

Sincerely yours,
Robert N. Hoyt.

It was voted that the Chair be authorized to appoint a committee of nine members of this Association to coöperate with the State Health Department on this question. The committee appointed is as follows: Dr. Robert N. Hoyt, Wellesley Hills, chairman; Dr. Frank W. Jackson, Brockton Board of Health; Dr. Edgar H. Guild, Springfield Board of Health; Dr. Clarence J. Allen, Winchester Board of Health; Mr. John A. Cook, Provincetown Board of Health; Mr.

David J. O'Connell, North Easton Board of Health; Mr. Raymond L. Newcomb, Salem Board of Health; Mr. George T. Lennon, Haverhill Board of Health; Mr. F. W. Howe, Framingham Board of Health.

The following paper on The Incorrigible Consumptive,—The Isolation of Persons Ill with Communicable Diseases, by the late Chester Bryant, formerly agent of the Haverhill Board of Health, was read by Dr. Elliot Washburn, Superintendent of the Rutland Sanatorium.

THE INCORRIGIBLE CONSUMPTIVE—THE ISOLATION OF PERSONS ILL WITH COMMUNICABLE DISEASES.

Chester Bryant,
Formerly Agent of the Board of Health, Haverhill, Mass.

THE problem of the vicious, incorrigible consumptive is one that probably no community of any size has escaped, and it has seemed to me that the legal side of the problem and the lack of a definite specific law whereby the unteachable, incorrigible and drunkard consumptive, who refuses to heed any demands of the health authorities, may be compulsorily segregated, are not the least trying of the many difficulties against which health officials have to contend.

The Massachusetts law makes it mandatory upon boards of health to care for this class of consumptives regardless of their conduct or their habits, and we fully understand this and know that under the present inadequate health laws, or the court's interpretation of them, we are absolutely helpless to remedy the present unfortunate condition of affairs.

The law requires each city to provide hospital accommodations for persons sick with tuberculosis and to aid them in other ways, but I do not for a moment believe that it was the intention of the legislature that patients of the class to which I have referred should themselves run and control these institutions which are built and maintained for the comfort, treatment and relief of persons ill with tuberculosis, at a considerable expense to the citizens who supply the money for their maintenance.

If these drunkards and troublemakers refuse to obey the rules and become otherwise objectionable in our state sanatoria, they are simply discharged from these institutions; but it is a duty, as I have said, made mandatory upon the city where these patients have a legal settlement, not only to make provision in some way for them, but to protect our citizens against the spread of tuberculosis as well.

This class of patient does just as he pleases at the hospital, goes out when he pleases and returns when he pleases, not infrequently under the influence of liquor, grossly insults the nurses and attendants, and absolutely refuses to obey the rules of the institution.

Our local tuberculosis hospitals are

not prisons, and there is no way by punishment, that I know of, to compel a person ill with tuberculosis to obey the hospital rules or to enforce the reasonable requirements of their management. Altogether, their conduct is such as to upset all discipline, and there should be some way to prevent them from seriously impairing or destroying the usefulness of our local hospitals. Already it is difficult enough to induce tuberculosis patients to enter them, and if there is no way to remedy the conditions that I have tried to describe, we might just as well close up the hospitals at once, because decent and self-respecting tuberculosis patients cannot be induced to enter them for treatment.

We have had two men in our hospital for more than five years and during that period we have paid out between three thousand and four thousand dollars for their board, clothing, etc. Both of them are alcoholics and unmanageable, although everything possible has been done for their comfort and welfare and to make them contented. One of them has been in the Lakeville State Sanatorium once and three times in the state sanatorium at North Reading, and their conduct while at these institutions was such that their superintendents felt compelled to notify us that these two patients will not be readmitted. One of them we were afterwards compelled to discharge from our tuberculosis hospital, on account of the trouble that he made for the attendants and the patients and the superintendent, who threatened to resign if he were not cared for elsewhere. Being obliged to provide for him in some way, we arranged to board him at a restaurant until other provision could be made for him. He is now maintained in a small portable cottage, which he occupies alone, on the city hospital grounds.

If we are to arrive finally at the complete control and ultimate eradication of tuberculosis, we must have laws, clear and specific, and reasonably administered, for the compulsory care of advanced cases of tuberculosis, a surprisingly large number of whom are ambulatory and alcoholics, who are unwilling to carry out essential sanitary precautions.

Dr. Bradford Pierce of Cambridge diagnoses the situation pretty accurately when he says, "If we are to have the responsibility let us have the authority and respect necessary for us to assume it."

Consistent, insistent and persistent efforts to educate the young so that they may know how to avoid infection, the backing and coöperation of local courts to secure the rigid enforcement of laws and regulations, clear, specific and definite, in the case of sufferers from this malady, and the erection and maintenance of a special state hospital where incorrigible and careless tuberculosis patients may be committed, similar to disposing of the common drunkard by the courts or magistrates for care and treatment, are the only methods that will ever reduce tuberculosis to a negligible factor in any community.

Under the authority of the Massachusetts legislature, repeated investigations and reports upon the system of caring for tuberculosis have been

made. The last report was made this year by a special recess committee of the legislature. Accompanying the report of this committee were two bills, providing for the care, treatment, removal and segregation of incorrigible tuberculosis patients.

It is to be regretted that these bills failed of passage in the legislature, for I confidently believe that by their enactment into law very great benefits would have accrued. Just why they were rejected by the committee to whom they were referred, no one seems to know; but it was probably due to the prevailing notion in the minds of many of our law-makers that health officials, who are struggling honestly and faithfully to serve most helpfully, and not possessed of sufficient intelligence, honesty of purpose, discretion and trustiness to avoid arbitrary exercise of authority conferred upon them.

But the movement for the suppression of tuberculosis has just begun, and there are, therefore, many loose screws in the machinery. Take, for instance, the discontented patient. He becomes tired of the hospital in his "settlement town" where he is being cared for, and feels the need of a change of environment, Without saying a word he packs up his traps and goes to Boston, Brockton, Springfield or to whatever town he may select. So in a few days a notification is received that he has been received into a nearby or a distant tuberculosis hospital, and a demand is made for reimbursement for the expenses of his board and treatment at this hospital. There is no law by which to compel his return to the town of his legal place of settlement; and the law makes it mandatory upon the board of health of the city that the patient has selected for his place of residence to provide for him, and the patient's "settlement town" must pay the bills for his hospitalization, although such town may have a hospital of its own—perhaps ordered by the State Board of Health—properly equipped, with expensive hospital facilities, with abundant room and with plenty of nurses and attendants with little to do, because patients that should be there are in hospitals in other cities where they do not properly belong. It is surely most essential that some means should be devised to prevent this extravagant system of caring for our tuberculosis patients.

There is need, too, of some restriction to prevent indigent sanatorium patients from marrying. I recall the case of a patient whose board we had been paying for quite a long time at a sanatorium. He and a woman patient at the institution obtained permission to remain away from the institution for a day or two. The day after they left they were married and both returned to the institution. The man had a Haverhill settlement, but the woman had never gained one, at least not in Haverhill. The moment she married, however, she took her husband's settlement, which made our city liable for the expense of the support of both the man and the woman. They are still in a sanatorium at our expense, and if children should be born of this marriage, they, too, will become public charges, and the tax-

payers of Haverhill must pay the expense of their support.

It is obvious, if we are to make any headway in the suppression of tuberculosis and in materially lessening unnecessary expense, all must combine, and it is incumbent upon us to use our personal efforts to have our laws changed or amended if they do not furnish the protection or accomplish the purpose desired, and put a stop to a condition of affairs that is little short of medieval.

Our attempts to isolate persons ill with communicable diseases other than tuberculosis, and to make proper provision for their medical care, have sometimes been disheartening. To cite one or two cases may be of interest.

A girl, eleven years old, was ill with typhoid fever. She was a member of a Polish family, consisting of the father and mother, and, including the sick girl, four children. Their dwelling was a one-story, two-room structure, consisting of a kitchen and a sleeping room for the whole family. There were no house sewerage facilities, and the liquid wastes were thrown on the surface of the ground. The privy-pit, simply a shallow hole dug in the ground, was open at the back, permitting the access of flies to the excrement deposited therein, and its contents overflowed on the surface of the ground about twenty feet distant from a well used as a source of water supply for the family, and only a few feet distant from the dwelling. Mounds of human excrement were scattered about the yard, including stools from the patient, and the two living rooms were swarming with flies from the yard and the privy pit. There was no physician in attendance upon the sick child, and at the time of my second visit in company with our city physician, the patient carried a temperature of 103° and a pulse of 140. The mother was absent at work in a shop, but the father happened to be at home at the time of this visit. After every possible effort had been made to obtain the father's consent for the removal of the sick child to the hospital, an application was made to the District Court to warrant such removal. Although there is no provision of law for it, the judge refused to issue the warrant without a hearing to the father, who must be given twenty-four hours' notice, and not even then until the record of the Board of Health showed a vote declaring that "in the opinion of the Board, the patient could not be properly isolated in her home." All these proceedings occupied a great deal of time. In the meantime, the girl continued to grow worse.

At the hearing in the court after summons to the parent, the father was finally induced to consent to the removal of the child and the warrant was, therefore, not served.

If, instead of a minor child sick with typhoid fever, the case had been that of a man ill with smallpox, for example, and the afflicted person had demanded and the court required a hearing, the situation would have been a serious one for the citizens of Haverhill. This situation, under the present laws of Massachusetts, or the court's interpretation of them, is liable to appear at any time.

By careful nursing at the hospital,

notwithstanding the delay in providing for her proper care, the patient made a very good recovery and there was no spread of typhoid fever from this case.

B was the case of a man ill with scarlet fever, and suffering from temporary mental derangement. A few days after, this man, of powerful physique, was isolated at his home, he became violent, and his wife and the attending physician applied to us for assistance in restraining him. He had escaped from his home and was, after a prolonged search, found in a stable connected with an ice-house, running about the place armed with a pitchfork, and threatening to attack any person who approached him. He was finally induced to return to his home, and we secured the services of a special policeman to nurse and restrain him. Later he became so violent that it required the services of three men to restrain him, and put him in a straight jacket to prevent possible injury to himself. We then applied to the court to have the man temporarily committed under the provisions of one of two statutes, the one providing that "persons suffering from diseases dangerous to the public health may be removed to a hospital on a warrant issued by the court," and the other under the law providing for the "temporary commitment to an institution of a temporarily insane person who is in need of immediate care and who is cared for by the board of health."

The judge would allow neither. Two physicians filed information that the man was ill with scarlet fever and was suffering from mental derangement, and was at the time insane although they believed that he would recover his reason. The judge informed me that he had no authority to issue a restraining order or warrant without a hearing, which, of course, considering the man's condition, was absolutely impossible. I called the attention of the judge to the fact that there was no provision of law for a hearing in the case of a commitment to a hospital of a person sick with a disease dangerous to the public health. To this he answered "that it was the inherent right of every man to be given a hearing, and that he didn't care if twenty-five persons contracted scarlet fever from exposure to a scarlet fever patient, and declared that he would order no one committed without a hearing." Shortly after this consultation, the man again escaped from his bed, jumped from a second-story window, and disappeared until eleven o'clock that night.

After the court's decision, the physician in attendance did not again dare to place the man in a straight jacket, and the police department refused to give the board of health further service. Unable to have the man committed or to restrain him at his home, despite the pleas of his wife who was badly frightened, we were in a quandary as to what course of procedure to take. Finally, however, the attending physician was able to get in touch with members of a fraternal organization to which the patient belonged, and this organization sent men to nurse and guard him. It is superfluous to say that the attitude of the courts is of vital importance to health officials

in their efforts to conserve the health of the people.

The impression has arisen that the powers granted to health departments for the purpose of safeguarding the public health are so sweeping in character that they have in their own right practically limitless power. Necessarily extensive as these administrative powers are, it is a misapprehension to conceive them as absolute. Both in practice and in theory the effective action of health boards depends upon the courts, and a health officer's efforts are often rendered idle unless these courts stand ready to apply the just force of the law when convinced of the facts.

Some of the judges that preside in our law courts do not appear to be men of very great breadth of vision. They were lawyers before they were judges, and in their zeal to protect the rights of the individual they sometimes appear to lose sight of the fact that communities have some rights, which it is the duty of these judges, as paid public officials, to assist in safeguarding.

It is essential that a greater degree of confidence should be placed in the judgment and discretion, and the spirit of fairness and sincerity and good faith of health officials, who presumably are better qualified to pass upon questions of health and sanitation, and of what is necessary to be done without delay, than anyone else.

Doctor Evans of Chicago once said, in referring to the law as it relates to health boards, "If these decisions (of the courts) are studied, it will be found that in many instances the judges have had to read facts into the evidence and quite frequently they read expert opinion as well. These facts and opinions are usually the opinions of the judges based upon their observations of matters of everyday life. There are certain lines in which their experiences eminently qualify these gentlemen. There are others where they do not."

There is a suggestion of such kind of judicial interference in a recent decision of the Supreme Court of the State of New Jersey, in the case of the Board of Health of Cranford Township in Union County versus Court of Common Pleas in and for Union County et al. To quote it may be interesting:

"It is not," the court said, "within the legislative intent, in enacting legislation conferring upon local boards of health the power to prescribe quarantine regulations in a district or locality infected with a contagious disease, to subject the discretion of such boards to the review of the local courts for the purpose of substituting the judgment of such tribunal for that of the board to which the power is specifically committed."

It may be of interest to this conference to know that last year a case arose on the petition of habeas corpus in the Supreme Court of Massachusetts, brought by Andrew McCarthy against the superintendent of our city hospital. McCarthy alleged in substance that he had been taken without a hearing before a magistrate, that he was forcibly detained and that he did not have tuberculosis. Upon the hearing before Judge ———, the medical testimony was that he was

infected with tuberculosis. We tried very hard to have the court consider the legal situation with reference to the constitutionality of the statute, but he refused to do this and remanded the petitioner to the custody of the agent of the board of health of Haverhill, on the general grounds that the man was better off at the city hospital than at home. While the decision as it stands upon the record was averse to the petitioner, the case as decided did not in any way clear the legal question, and throws no light one way or the other. In an off-hand way during the progress of the case, Judge ——— said he doubted the right of any board of health to take a person infected with tuberculosis without a hearing before a magistrate, but he declined to decide that point of the case, so that his remarks were merely dicta. This man was taken to our hospital on a warrant issued by one of the judges of the Central District Court in Haverhill, under the provisions of section 46 of Chapter 75 of the Revised Laws, which reads as follows:

"A magistrate authorized to issue warrants in criminal cases may issue a warrant directed to the sheriff of the county or his deputy, or to any constable or police officer, requiring him, under the direction of the board of health, to remove any person who is infected with contagious disease, or to impress and take up convenient houses, lodging, nurses, attendants and other necessaries. The removal authorized by this section may be made to any hospital in an adjoining city or town established for the reception of persons having smallpox or other diseases dangerous to the public health, providing the assent of the board of health of the city or town to which such removal is to be made shall first have been obtained."

To the ordinary man on the street both the language and the intent of this statute would seem to be quite clear and unmistakable; but the super-strict and technical narrow-mindedness of trial judges, or at least some of them, does not permit them to give this statute, in the interest of public health, a broad and liberal interpretation in order to carry out its manifest and wholesome purpose and object.

Discussion.

Mr. Prendergast: As one of the trustees of the four state sanatoria, I cannot agree with the previous speaker. I think the worst element that we have in the success of those hospitals is the incorrigible, and we will continue to have him. In fact, in one of our institutions we have to discharge at least two patients a week as being incorrigible, being ones that we cannot do anything with, who are a menace to themselves and a menace to the other patients. In regard to the couple referred to in the able paper which was so well read by Doctor Washburn, I would say that that couple has turned out very well indeed. The only time they broke the law was when they fell in love; I believe there is no law against that, because I believe that wherever there is love there is some fever. The young couple, at the suggestion of Doctor Washburn, was transferred to one of the other institutions; since that time, about twelve months ago, the wife was discharged as cured and is learning to become a nurse, and yesterday I got a report from the same institution that the husband has just been discharged as improved and has been hired as an orderly, both giving excellent satisfaction.

But I think that one of the greatest problems that we have in the control and cure of tuberculosis is the incorrigible, and we have them where they travel from one institution to the other, and when they are discharged from one the greatest amount of influence is brought to bear to put them back again. I firmly believe that you will never succeed in the care and cure of tuberculosis unless you have a separate institution for the control, against their own wishes, of the incorrigible and not merely a boarding place as they have now.

Doctor Durgin: I have been thinking since I heard this paper read that I must have been recently guilty of violating the law very often. I am under the impression that the statute law of Massachusetts justifies every local board of health in seizing any case of infectious disease and not only placing it in safe-keeping, but in holding him until he is a safe party to go abroad in the community. That is what we did in Boston. Moreover, in Boston, whenever there was manifest liability that some infectious patient in the city hospital was likely to be taken out while yet infectious the board of health was notified, the patient's room properly placarded and an order sent to hold that patient until it was thought best, by the physician in charge, to release him. That was law in Boston. I believe the same authority exists in every local board of health in the state of Massachusetts. I should avoid the courts as much as possible in cases where the patient is properly placed.

Dr. Sumner Coolidge: I wish to express my hearty approval of every word of the paper that has been read. As superintendent of a state sanatorium now nearly six years I have had a little experience with the class of patients that is referred to in this paper. Doctor Durgin has told us what they do in Boston. Perhaps Doctor Durgin does not know that 50 per cent. of my cases come from Boston. When they catch the case in Boston, they have got him, and I presume they handle him well, but when he cuts up in my institution so that it is impossible to keep him there I wonder how long it is before Boston gets hold of him again. We have cases that seem to me high-grade imbeciles. We have wilfully malicious fellows. We have men and women simple in their own conceit, who should be placed in this class. I don't call them incorrigible; they are a class of people who refuse to be controlled, to have their actions controlled and their conditions controlled. There are people, apparently as intelligent as we are here, so conceited that they do not take the doctor's word; the demonstration of tubercle bacilli does not convince them that they have got consumption, and they go about from one hospital to another or from one boarding house to another, spreading the disease. From any point of view there is necessity for some special treatment of this class of consumptives. Economically, there certainly is reason. I have had individuals admitted to my institution three separate times, each time make a fair recovery to a condition that may be called quiescent, in which they say, "I feel able to work." "I am going out to try it." "We have only got one life to live." "I am going to take the chance," etc. They have remained in the institution perhaps nine months or a year after each admission, and have used up some good money of the city or the state. And by the way, just about four or five per cent. of my people now pay their own way. The disease of having their expenses paid in these institutions by the town or the state is very catching, and they have all caught it. As I say, less than five per cent. are paying their own way. A good lot of money is spent to put these men on their feet. A case in question was that of a man who had been in my institution about two years. The other day as one of my assistants rode slowly up the avenue at Nantasket he saw a man some distance ahead fall on the sidewalk. He said that man was so drunk he could not even turn over after he fell down. As he came up to the man he recognized this ex-patient of ours whom we had worked with, and whom the city of Boston had paid for, wallowing in the dust and dirt. That fellow has not come back, but he will come back. As I say, I have had them come three times. That is the economical standpoint. Medically, what can we say of these patients that go home against advice or misbehave in the institutions? It seems to me that the conceited ones, the ones who love their families so much, and have small children at home, not necessarily the dissipated ones, are the most dangerous to the rising generation. Something has got to be done to teach them that the community has rights. And socially!

Well, I hardly know what to say about this matter socially, but this is no time to theorize about it. The fact confronts us that there is a large class of patients—not the majority by any means, for most of our people are law-abiding, self-respecting people, who conscientiously try to get well—who demand compulsory segregation. I say it is a disgrace to our institutions, it is utterly wrong for us to keep in these institutions a set of people who make it impossible for the conscientious ones to get their rights, and at the same time make it impossible for the tuberculosis workers to do effieient work outside the institution.

Doctor Durgin: I think, Doctor, that your local hoard of health has the right to authorize you to keep him if you choose to keep him. I agree with you that it is a great nuisance in such an institution. We had the same trouble at Lond Island, and we had to authorize them as agents to hold the patients there just the same. But I think your local board of health has the authority under the law to restrain that party in your institution.

Doctor Coolidge: The city of Boston, you see, has a fine hospital in which to care for these patients after they seize them. The average small town may have the authority to seize them, but has no place to put them, and they are in a dilemma worse than ours. If we keep them in our institution, they sometimes purposely mishehave. They say,—in talking about the matter to other patients—"I would like to get fired." "I would like to try this or that other institution." It is a real dilemma that small town boards of health find themselves in very often having no place iu which to eare for ineorrigihles.

Doctor Durgin: I think they ought to he hy themselves.

Doctor Coolidge: It is impossihle for us to keep them.

Doctor Denny: I think this topic appeals to every board of health; we are all anxious to see something done. We have discussed this same question several times before, and now we would like to feel that this Association is working on the problem. I would therefore move that the Chair appoint a committee of five to consider this problem and to make recommendations.

Doctor Durgin: I second the motion.

Mr. Prendergast: I would like to have in that motion, if Doctor Denny would incorporate it, that that committee either report back to this Association or report a bill to the legislature recommending some legislation that will clearly define the rights of holding incorrigibles against their own wishes. I think we ought to do something hesides just pass motions.

The President: Does Doctor Denny accept that as an amendment?

Doctor Denny: Yes.

Doctor Washburn: I would like to ask Doctor Durgin if any of these patients whom he held ever carried their case to the court. It is easy enough to hold a man if he does not object to being held.

Doctor Durgin: No.

Doctor Washburn: In this Haverhill case, the man objected and went hefore the court, and the judge refused to uphold what Doctor Durgin considers to be the law, and which very likely is the law.

Doctor Denny's motion was adopted.

The following committee was appointed: Chairman, Mr. Seymour H. Stone, Boston; Dr. F. P. Denny, Brookline; Mr. Daniel L. Prendergast, Boston; Mr. R. P. Borden, Fall River; Dr. Sumner Coolidge, Middleboro.

The following paper by Dr. Francis George Curtis was then read:

SOME INCONSISTENCIES IN DEALING WITH TUBERCULOSIS.

Francis George Curtis, M. D.,
Chairman, Newton Board of Health.

TO THE local board of health, upon whose shoulders the responsibility for the care of persons ill with tuberculosis first falls, the position taken by the state authorities in regard to many aspects of the tuberculosis question seems illogical and the measures which they require the local boards to carry out seem burdensome and impossible of fulfillment.

The different state departments with which the local boards come in contact when dealing with tuberculosis are the State Department of Health, the State Board of Charity, the trustees of the hospitals for consumptives and sometimes the courts.

The State Department of Health, acting under the power delegated to it by the legislature, has declared tuberculosis, in all its forms, a disease dangerous to the public health, and by doing so has put certain responsibilities on the local boards.

These responsibilities are defined by two agencies—first, the general statutes dealing with all diseases dangerous to the public health and, second, certain special statutes passed by the legislature from time to time dealing specifically with tuberculosis.

Under the general statutes, the duties and powers of the board of health when dealing with any disease dangerous to the public health are laid down.

Sections 32 to 42 of Chapter 75 of the Revised Laws as amended by Section 1 of Chapter 365 of the Acts of 1906, provide, among other things, that each city shall establish a hospital for the care of persons sick with diseases dangerous to the public health; that the board may cause any sick or infected person to be removed to such hospital or place, if it can be done without danger to his health, otherwise the place where he remains can be turned into a hospital and be subject to the regulations of the board.

Section 43 of the same Chapter 75 of the Revised Laws provides that if such a disease (*i. e.*, a disease dangerous to the public health) exists in a town, the selectmen and the board of health shall use all possible care to prevent the spread of infection.

Section 46 of Chapter 75, as amended by Section 2 of Chapter 365 of the Acts of 1906 provides how the removal shall be accomplished, presumably if the patient is refractory.

The specific laws in regard to tuberculosis direct that all cities shall provide hospitals for the care of tubercular patients and further that these same cities and all towns of over 10,000 population shall maintain dispensaries for the free examination and treatment of tubercular patients.

To summarize: The city, under penalty of a fine, must provide for the care of poor persons who are ill with

tuberculosis by furnishing hospital accommodations, dispensary treatment, medical attendance, medicine, nursing, food, clothing, etc., and all this without any regard to local conditions or to the necessity for such provision, in any given community.

There is a plethora of law to provide for the care of the sick and the protection of the public.

Now let us see how these things work out in actual practice.

Owing to the propaganda established by boards of health, anti-tuberculosis leagues and similar agencies, the laity, having learned that tuberculosis is a communicable disease, has acquired a very lively fear of "catching" it and demands loudly that something shall be done to protect the public.

While this is a very worthy desire, its practical application is hardly logical. To the excited layman a case of tuberculosis is a case of tuberculosis, of the "Great White Plague," and must be taken care of at once.

Even if he has lived in the same house with it for months in perfect serenity, before he knew what it was, the moment a physician pronounces the dread word "tuberculosis," it becomes fearsome and not an instant must be lost before something is done with it. He can't even wait twenty-four hours.

It makes no difference whether the patient is in the incipient stage and is well cared for at home or whether he is a drunken incorrigible in the last stages, something must be done to protect the public, preferably by sending the case to a hospital.

The layman has also learned that the board of health is responsible, by law, for furnishing the necessary care and so he bombards the office with demands that it shall act.

The incongruity of it is that the layman is right; it is the duty, under the law, of the board of health to prevent the spread of infection, by sending the patient to a hospital or by other means, and yet, under the interpretation of that same law, it is practically helpless.

The board of health is made responsible, by law, for the safety of the public and the care of the sick person, but, in the case of a person sick with tuberculosis, it is denied the means of enforcing measures to insure that end.

No matter how careless the patient may be, he is at liberty to go about, as long as he is physically able to do so, and the board of health cannot prevent him. It cannot isolate him at home nor can it put him in a hospital against his will.

Even if the board can persuade him to go to a hospital, a hospital which it has been compelled by law to build and maintain for such as he, it cannot keep him there, if he wishes to leave. If he prefers to stay and break every rule it cannot discipline him except by throwing him out, which is simply avoiding the issue.

There must be something radically wrong with a system which permits the existence of such a condition.

The chief difficulty seems to lie in the fact that while tuberculosis has been declared a disease dangerous to the public health, persons ill with tuberculosis are put on a different plane from persons ill with other

diseases of the same class, and the courts, or some of them, will not give boards of health the necessary backing.

To the ordinary person, it seems clear that the law intends that boards of health shall have the power to remove to a hospital, forcibly if necessary, a person with a disease dangerous to the public health.

Section 36 of Chapter 75 of the Revised Laws as amended by Section 1 of Chapter 365 of the Acts of 1906, says: "The board of health may cause any sick or infected person to be removed to such hospital or place, if it can be done without danger to his health."

Section 3 of the same chapter says: "The provisions of Sections 36 and 46 of the Revised Laws so far as they confer authority for the removal of patients from their homes, shall apply only in case of persons residing in boarding houses or hotels, or in the case of two or more families occupying the same dwelling, or in other cases in which, in the opinion of the board, the case cannot be properly isolated."

It seems perfectly clear that it is the board of health and not the courts which shall decide whether or no the patient shall be removed.

It is difficult to understand the attitude of the courts, unless, indeed, they fear that this power will be abused by boards of health or else that they lay too much stress upon the rights of the individual. As for the first, boards of health are composed of earnest, careful men, doing their best to protect the communities which they serve and very reluctant to resort to the strong arm of the law until every means of achieving the desired result has been exhausted, while as for the second, the individual must always yield to the general good of the community.

Let us suppose that the patient has been induced to enter a hospital and, on looking up his history, it is found that he has no settlement but is a "state case." In this event the commonwealth is responsible for his care but the place of residence must first pay the bills and then transmit its claim to the State Board of Charity for audit and approval.

Section 1 of Chapter 386 of the Acts of 1906 says: "Reasonable expenses incurred by the board of health of a city or town or by the commonwealth in making the provision required by law for persons infected with smallpox or other diseases dangerous to the public health shall be paid by such person or by his parents, if he or they are able to pay, otherwise by the city or town, in which he has a legal settlement." . . . then follow directions about determining the settlement and the section ends: "If the person has no settlement such expense shall be paid by the commonwealth upon approval of the bills therefor by the State Board of Charity."

There is a question here about the interpretation of the words "reasonable expenses." It may cost the city fifteen dollars a week to care for the cases, but all that it can get from the state is seven dollars per week, thus penalizing the place of residence in the difference between this amount and the actual cost of caring for the case.

If the city puts in a claim for the

subsidy, the State Board of Charity promptly reduces its payment to two dollars a week, and tells the city to collect the subsidy from the trustees, so that all the city gets in any case is seven dollars. Of course this defeats the object of the statute allowing the subsidy, as a subsidy is a gift, not a payment for work done.

Again, when a state case has been sent to a sanatorium, thus relieving the local board of responsibility, it often happens that the patient becomes dissatisfied and leaves, "against advice," returning to the locality from which he was originally sent. He again becomes a charge of the local board and in this event the red tape becomes so snarled as almost to destroy any hope of untangling it. The local board having once reported the case to the State Department of Health and the State Board of Charity, proceeds in its innocence to incur further expense on his behalf and, having done so, forwards its claim for reimbursement, only to be met with the ruling that the case is a new one and before the claim can be allowed, it should have been reported, not only to the State Board of Charity but to the State Department of Health under Section 52 of Chapter 75 of the Revised Laws as amended by Chapter 480 of the Acts of 1907 and, as the board has failed to do so, the claim is thrown out.

When one considers that under this ruling, the same man may be reported to the State Department of Health, by the same locality, several times, comment seems unnecessary.

Another thing which adds to the difficulties of local boards, is the peculiar position taken by the trustees of the hospitals for consumptives in regard to the admission of patients to state sanatoria.

By a recent decision of the courts any physician may file an application for admission of a patient without notice to the local board of his intention to do so. This is acted upon by the trustees and in due time the patient is admitted, and all that the board of the place of settlement has to say about it, is what it says when it has to pay the bills.

This is the only instance with which I am familiar where a private citizen can of his own initiative place a lien upon the municipality, but under the decision referred to, it is perfectly legal and no fault can be found, but fault can be found with the fact that the trustees will accept a physical examination by any physician as evidence of the necessity for sanatorium treatment. They do not ask for a positive sputum. Whether or not the presence of tubercle bacilli in the sputum is a necessary sign of danger, may be ignored for the present, but the fact remains that persons who have persistently shown a negative sputum have been admitted and readmitted to sanatoria, sometimes the history extending over several years, and have been paid for by the local board as cases of tuberculosis.

Let, however, the local board claim the subsidy for a case cared for in a local hospital and before the trustees can approve the claim, an affidavit is required that tubercle bacilli have been

found in the sputum and, as if that were not enough, the examination must be made at a laboratory approved by them.

In other words, if the trustees have a claim on the local board, a simple physical examination is sufficient to declare a patient a fit subject for admission to a sanatorium but, if the local board has a claim upon the trustees, an affidavit of the presence of tubercle bacilli is demanded. Surely this is the acme of inconsistency!

It is easy to point out faults but difficult to show a practical remedy, although it seems as if, in the matters referred to, almost any change would be for the better.

As far as the first difficulty is concerned, the remedy seems simple; the real problem is in the treatment of the incorrigible, a matter already spoken of in another paper.

I believe that the law confers upon boards of health the necessary power to put a patient in a hospital, leaving it to the courts to carry out their rulings. The non-tubercular alcoholic can be sent to an institution and kept there against his will, and the same treatment should be dealt out to the tubercular alcoholic. For the non-alcoholic incorrigible, of which there are not many, the formal action of a board of health stating that, in its opinion, after careful consideration, he requires restraint, should be honored by the courts. Boards of health can be trusted not to abuse their powers and should be sustained.

This would also do away with the practice of discharging patients from sanatoria "against advice" or as a measure of discipline—a practice which seems illogical. If the patient was suitable for sanatorium treatment when admitted, he is no less so because in a few weeks he becomes discontented and wishes to leave.

Reasonable expenses should be interpreted as the actual cost of caring for the case, not as an arbitrary amount. In paying for a "settled case," the place of settlement has to pay the actual cost to the place of residence, and the commonwealth should do the same. If necessary, an itemized statement showing how the rate is calculated could be submitted.

In cases where the subsidy is allowed, the amount of the subsidy should be paid in addition to the reasonable expenses, for, as already stated, a subsidy is a gift given as a reward, not a payment for services rendered.

State cases which have been discharged from or have left a sanatorium, when asking for aid again, should be accepted by the Board of Charity on a simple aid notice and should not be required to be reported again under Chapter 480 of the Acts of 1907.

Under the decision of the courts already referred to, nothing can be done in regard to the admission of patients on private applications, although a statute might be drawn requiring the indorsement of the local board in cases for which it is liable to be called upon to pay.

The trustees should give the same treatment to local boards in the matter of calling patients who are public charges tubercular, that is accorded

to them by law when the local boards desire the subsidy.

I believe that the smoothing out of these differences would tend to lessen the friction which at present exists between the state and local boards and go a long way toward increasing coöperation between bodies which should work together in harmony.

Discussion.

Mr. Seymour H. Stone: Mr. Chairman, may I ask Doctor Curtis two questions? He says that non-tuberculous alcoholics can be sent to a hospital. Will he let us know which hospital non-tuberculous alcoholics can be sent to? Also he makes the statement that the subsidy is a gift from the state. As I understand the law, it infers that the subsidy is to be paid for the board of patients at the local hospital.

Doctor Curtis: I said that non-tuberculous alcoholics could be sent to an institution—not to a hospital—to a state institution, Foxboro, for instance.

Mr. Stone: Is it not necessary to have the consent of the patient? The patient is not forcibly sent, is he?

Doctor Curtis: I think sometimes they are sent forcibly by the courts. Chapter 579 of the Acts of 1911, as amended by Chapter 637 of 1912, provides: "Every city or town which places a patient suffering from tuberculosis in a municipal or incorporated tuberculosis hospital in such commonwealth shall be entitled to receive from the commonwealth a subsidy of five dollars a week for each patient who is unable to pay for his support." This is a letter from Mr. Goodhue, in which he quotes the law—this is in regard to a specific case—and ends:

"It therefore appeared to this division that in the case of Luther Kenalian, the city of Newton was entitled to the subsidy of five dollars per week, and your claim was allowed under the opinion of the Attorney-General at two dollars per week, being the balance, less the subsidy, of maximum allowance of seven dollars per week."

That is, as I stated, they take the subsidy as a part of the payment, though I think almost any definition of subsidy is a gift. That is an opinion of Attorney-General Malone, added to by a verbal statement, it is not in writing.

State Board of Charity,
Boston, Jan. 26, 1914.

Francis George Curtis, M. D.,
Chairman Board of Health,
Newton, Mass.

Dear Sir:

In reply to yours of the 22d inst., the provisions of Chapter 579, Acts of 1911, as amended by Chapter 637, Acts of 1912, provide:

"Sect. 1. Every city or town which places its patients suffering from tuberculosis in a municipal or incorporated tuberculosis hospital in this commonwealth, shall be entitled to receive from the commonwealth a subsidy of five dollars a week for each patient who is unable to pay for his support, or whose kindred bound by law to maintain him are unable to pay for the same, but a city or town shall not become entitled to this subsidy unless, upon examination authorized by trustees of hospitals for consumptives, the sputum of such patients be found to contain bacilli of tuberculosis, nor unless the hospital building or ward be approved by said trustees, who shall not give such approval unless they have by authority of law, or by permission of the hospital, full authority to inspect the same, at all times. Said trustees may at any time withdraw their approval."

The rules and regulations adopted by the trustees of hospitals for consumptives under the provisions of Chapter 579, Acts of 1911, and Chapter 637, Acts of 1912, in part, are as follows:

B. The commonwealth will not be liable for the subsidy for more than thirty days prior to sending requests for state subsidy for any given patient.

C. The state subsidy of five dollars per week per patient whose sputum contains tuberclé bacilli may be granted for,

(a) Indigent cases having local settlements in the town or city requesting the subsidy.

(b) Certain indigent cases having legal settlement in the commonwealth, but cared for in hospitals or wards approved by the board.

D. The state subsidy shall not be granted for cases having legal settlement in other towns.

It, therefore, appeared to this Division that in the case of Luther Kenalian the city of Newton was entitled to the subsidy of $5.00 per week, and your claim was allowed under the opinion of the Attorney General at $2.00 per week, being the balance less the subsidy on the maximum allowance of $7.00 per week.

Respectfully,

F. W. Goodhue,
Superintendent.

Doctor MacKnight: I would like to ask Doctor Curtis three questions. First, if a patient is admitted to a sanatorium by an order of the court, how must he be discharged therefrom? By an order of the court? Second,—

The President: Hadn't we better have the questions one at a time, and then we won't get confused?

Doctor MacKnight: All right. How is he to be discharged, having been admitted by order of court?

Doctor Curtis: Well, not being a lawyer I don't know that I could answer that exactly, but he could be admitted under an order of the court exactly as a case of scarlet fever can be. When the authority, Doctor Coolidge, says he is well, then he can be discharged. They discharge some.

Doctor MacKnight: The next question is —what a board of health can do after paying the sanatorium rate for one of its tuberculosis patients. Has it any control in the determination as to the length of time that patient shall stay in the sanatorium, providing they (the board) are willing to pay the bill? or third, because he is simply incorrigible, can he be turned out, without the consent of the board of health paying his way?

Doctor Curtis: The board has absolutely no control over the length of time. I have paid for cases that have been about four years, I think, or five years, in state sanatoria. They have no control as to keeping them there or sending them out—I think that is right, absolutely no control.

Doctor MacKnight: The next question is whether the board of health in whose jurisdiction the sanatorium happens to be has any control as to what shall happen to the patient once he is discharged from the sanatorium walls and premises into the confines of that town.

Doctor Curtis: I could not answer that. I would refer it to Mr. Prendergast.

Mr. Prendergast: I would say he came back into the control of the local board of health. We have got enough of them. We make it a point to notify the local board of health, the local tuberculosis society—don't we, Doctor?—(Doctor Coolidge) and the State Board of Charity, that we have discharged that man, and give the address he is supposed to go to.

The President: It seems to me that the difficulties that had been brought up so far about the incorrigible consumptive and the difficulties surrounding the details of administration, both legally and otherwise, are really rays of hope in the whole question of the control and suppression of tuberculosis. When you come to think that it is only since 1882, a short thirty-three years ago, that the tubercle bacillus was discovered, and of course a much shorter time since active measures were undertaken by the provision of the courts and of legislative bodies generally, progress, while it has not kept up with science in the knowledge of the facts, has really been in the main fairly satisfactory, and these difficulties which, while they are important difficulties and are often very annoying, are nevertheless what might be called minor questions involved in the whole great question, and certainly will be solved.

The next item on our program is Concerning Tuberculosis Dispensaries. This discussion will be opened by Mr. Seymour Stone of Boston.

Discussion Concerning Tuberculosis Dispensaries

Mr. Seymour Stone: I think we all admit that tuberculosis is still a great problem. While we have made great progress in diminishing the mortality from tuberculosis, we still have in our state in one year a total of 5,400 deaths. If this death-rate is to continue to drop, we must do more intensive work. The cases must be discovered in earlier stages. Other members of the family in which there is tuberculosis must be examined, particularly the children. Many physicians and experts are now beginning to believe that tuberculosis, as a rule, originates in childhood; and, if this is the case, we certainly should have the children, at least of tuberculous families, under very close supervision. Then, again, the patient who is discharged from the sanatorium or hospital, whether state or municipal, should be under some local supervision. The trustees of hospitals for consumptives have an after-care worker, as probably most of you know, whose labors have clearly demonstrated the need of much more follow-up work by boards of health and other local organizations, in connection with patients discharged from sanatorium or hospital, whether the patients are incipient or advanced cases, it being, indeed, even more important to keep track of the advanced than of the incipient case.

One of the best means of accomplishing this more intensive work is the tuberculosis dispensary. The state recognized the value of this institution when it passed the law which requires cities and towns of 10,000 inhabitants and over to establish tuberculosis dispensaries. There are 54 such cities and towns in the state of Massachusetts. Very little was done to comply with this law until the beginning of the current year, when the Health Commissioner notified these communities that unless they lived up to it they would be liable to prosecution and subject to a fine of five hundred dollars. It is an interesting fact that every one of the 54 cities and towns has now complied with the law by establishing a tuberculosis dispensary. There are, it is true, six or seven cities and towns in which the dispensaries have not received the final approval of the State Department of Health, but the difficulties are minor ones and undoubtedly will very shortly be adjusted and the dispensaries approved. There are representatives of the State Department of Health here, and I hope that they will enter this discussion and tell us a little more in detail the actual working of this very interesting law.

The success of these dispensaries now depends very largely upon the attention given to them by the local boards of health and by such local organizations as the anti-tuberculosis society, the district nursing association, and any other civic body interested in the eradication of tuberculosis. The dispensary must be brought more forcibly to the attention of the general public; in other words, it must be given publicity. Where dispensaries have been started in cities and towns and have had very little to do, the principle reason for this condition has often been that the public has not known of the existence of such an institution. Just as soon as the dispensary is given publicity in these places it begins to find plenty to do. If I am not mistaken, Brockton, which has kept its dispensary before the public through the newspapers, is an illustration of this point. I saw the other day where this city had in one day twelve patients, six of whom were new. If this is the case in a city the size of Brockton, there must certainly be more cases that should come to dispensaries in the larger communities.

There are different methods of advertising a dispensary, and the same method will not work equally well in all communities. In the smaller towns it may be best not to keep the dispensary too constantly in the public eye, but certainly in the larger communities it ought to be given a great deal of publicity. This may be done through newspaper articles. The local anti-tuberculosis association, or other civic body.

The Boston Association for the Relief and Control of Tuberculosis has given aid by advertising the local dispensary in the motion picture theatres. When the night clinic was opened at the Boston Consumptives' Hospital the motion picture theatres, twenty-five in number, agreed to display on their screens at every performance for a number of days an announcement which our anti-tuberculosis society sent to them calling

attention to the opening of this dispensary. The night clinic has ever since had anywhere from nine to twenty patients in the one evening of each week, when it is open. The coöperation of the labor unions has furthermore been secured through a letter announcing the opening of the clinic. Ministers, also, if interested, will be able to call it to the attention of needy families, and there are undoubtedly other methods of bringing the dispensary before the public.

A most valuable feature of the dispensary, it seems to me, is its ability to discover the early stage cases, thus greatly increasing the chances of recovery for the patients. With the exception of the doctor, the most important part of the dispensary is the nurse, who, in her visits among families, is often able to induce others to go to the dispensary for examination, and thus secure advice and treatment in the early stages. A dispensary, rightly managed, has a distinct educational value.

Now that we have this efficient dispensary law in full operation, let us all work together and give it an honest and impartial trial to determine whether or not the many experts and public health officials are right in their judgment that the dispensary method of handling tuberculosis and the general health problem, combined with the visiting nurse, is of immense value. I should like also to point out the interesting fact that some of these dispensaries are not only tuberculosis centers, but have gone a step further and become general public health dispensaries. This, for instance, is the case in Beverly, and I understand that there are other larger communities following suit.

Doctor Thompson: I should like to ask Mr. Stone what objection there is to publicity in the smaller communities. He spoke of an objection in the smaller communities.

Mr. Stone: Personally, I don't believe there is any objection, but in talking it over with members of the boards of health in some of the smaller communities I find they feel that where everybody knows everybody else it is well not to give the dispensary too much publicity, for the reason that people often do not like to be seen going to it. I don't believe that this is a very valid reason, although I am not perhaps in a position to judge, as I do not work in the smaller communities.

Dr. Walter G. Phippen: Mr. Chairman, the few things that I want to say about tuberculosis dispensaries come from an experience in building up a dispensary in Salem which came not because we had to have it, but because we saw the need of it and so gradually developed it, and it is of the need of dispensaries that I wish to speak first.

I think when this law requiring cities and towns to have dispensaries was passed there was some doubt in the minds of some towns whether they really needed such a dispensary or not. Now I don't think there is any doubt, because a tuberculosis dispensary is entirely different from any other kind of dispensary. It is different in that every case that is admitted to that dispensary is always on its list. That multiplies thousands of times the number of cases that it has to look after. By that I mean to say that if a case is reported and is found to be tuberculous the dispensary must examine every one of the family of that case. That may mean a dozen or even more examinations, which makes a lot of work for that dispensary right off from simply one reportable case. Then all the cases that are sent back from the state sanatoria must be followed up, and they should be followed up through the local dispensary. So that the number of cases that are actually reported in any given year in any community is no criterion of the amount of work that that dispensary is called upon to do.

When you once have your dispensary, as Mr. Stone has pointed out, that is not sufficient. People won't flock to your dispensary. You have got to feed it. Mr. Stone has pointed out various ways of advertising your dispensary. There are other ways by which the dispensary is fed. If you have a local anti-tuberculosis society in your midst, that provides an automatic method of feeding. They will see that the dispensary has plenty of work to do. Then your physicians. Your physicians sometimes perhaps will be a bit backward about sending cases to you for examination, but be patient. Before very long you will find that they will gladly avail themselves of the privileges that the dispensary offers, because through its instructive nurse any quantity of little details can be attended to much better and much more promptly than by the physician himself. The school

physician and the school nurses will and should send many cases to the dispensary, not cases that are tuberculous, perhaps, but cases that are suspicious, and, as the dispensary is largely a preventive measure, that work is very important. Then your charity organizations should be seen and talked to, and they will also provide many suspicious cases for you to look after. Another source of supply are the friends of patients. It has been a very gratifying thing with us in Salem to find how many friends of patients have come to the dispensary for examination simply because they thought they might have the disease. We have been able to find a considerable number of early cases that way. I have spoken of the hospitals and the state sanatoria. Personal applicants will probably be few, but they will come gradually.

Mr. Stone has said that, next to the doctor the nurse is the most important part of the dispensary. I would amend that and say that the nurse is *the* most important part of the dispensary. I don't think that the doctor counts nearly as much as the nurse. She is able to do a great deal more. Some of the things that we find that she has to do in the ordinary routine of her work are as follows: Investigating the housing conditions and recommending needed changes; interviewing the employer — a very great amount of work to be done there; providing an outfit for the patient if the patient is to go to a sanatorium—they don't know what to buy themselves, someone must show them, and the nurse is the one; providing temporary means of treatment while they are waiting sanatorium treatment, as you all know, it takes quite a while for patients to be admitted to the sanatoria, and the treatment should be begun immediately that they are discovered; providing additional food, such as milk and eggs; obtaining the dependent mothers' pension in certain instances; securing permanent relief for the family; bringing the family to the dispensary for examination; arranging for the treatment of other illnesses found in the course of the examination, such as adenoids, tonsils, etc.— a very important part of the work of a tuberculosis dispensary; obtaining proper orthopedic care for the bone and joint cases, including splints, dressings and other apparatus, which requires no end of detail work; securing employment for incipient and arrested cases. This requires also, of course, the coöperation of the medical director, who should be the final judge of the fitness of the work.

Then the matter of records. I think the records are perhaps the second most important part of the dispensary. Accurate records should be kept of every case that enters your dispensary. I believe very thoroughly that there should be one list, alphabetically arranged, of every case that ever enters the doors of your dispensary. From that list references should be made by number to folders. The folder should contain a card containing the whole history of the patient, social history, medical history, etc., also a card containing the instructive nurse's records and all letters, notices, admittance certificates from the state sanatoria, etc., all filed together in one place, so that if anyone comes at any time and says, "Has Mr. So and So ever been to your dispensary?" you can go immediately to one catalogue and find out whether he has ever been there or not, and that catalogue will tell you what disposition was made of him, whether he was tuberculous, whether he was not tuberculous, and if tuberculous where he went.

I think that a street index is of considerable value. We had a street index in Salem. As you know, a large part of our city was burned last year, and our street index was of immense value in rounding up cases after the fire. About two thirds of our tuberculosis cases were burned out, and the day after the fire by simply taking out the cards of this street index of the houses that were burned, we were able to go through the different detention camps and isolate them in one camp. It was of immense value there, and I can conceive other instances where it would be of great value.

Those to me are the important points about the dispensary. I think that it is very encouraging to feel that every city and town now has a dispensary, and we hope now that they will all make good use of it.

Doctor Pierce: So far, the gentlemen who have spoken on this question have spoken principally of the charity cases. I would like to ask what the opinion is as to how far, in well-to-do cases, the board of health in its dispensary work should go in its care of tuberculosis. For instance, take that class of patients who are not charity patients, who are attended by their own physician. The physician, I think, is very apt to resent the fact that the local board of health

wants to step in and perhaps establish a record and perhaps in some way supervise that case, and yet in order to do a real work it would seem to me that all cases had got at least to be under the supervision of the local board of health and also under the dispensary. How far is it the intention that the local board of health should go in regard to the cases which are not charity cases?

Doctor Phippen: I believe that the physicians should take care of their own cases and the dispensary should not have anything to do with the care of the cases, unless asked to do so, but I believe every case should be reported to the dispensary where it can be put on record. If the local physician wishes the instructive nurse to visit or do anything for the patient, I think the instructive nurse should do so, otherwise I don't think she or the dispensary has any authority.

Doctor Pierce: Mr. Chairman, I don't see why her work would be very effective in a case of this kind. It would seem to me that your work is going to fall shy. It is very possible there are some private patients who say they have their attending physician looking after their case, and perhaps he is called in occasionally, but it might come to your attention that perhaps this family was really dangerous to the community. Are you not supposed to step in and try in some way or other to control the action of that family, even though they are not charity people?

Mr. Jackson: I believe that a doctor, if you took his patient away from him, would not report any more cases. In our city, whenever a doctor reports a case of tuberculosis, we ask the doctor if we will send our nurse there. We believe that the doctor is honest, and if he tells us that everything is being done that could possibly be done, under his supervision, and that the patient is no danger to the rest of the household and that all the care that a patient should have, he or she, whichever it happens to be, is having, we leave that case alone for the time being, with the instruction to the doctor that at any time that he would like to have our nurse go there we will send her. This is Brockton, that one of the doctors spoke about. He said he had seen where there were eight patients at one of our dispensary meetings. Well, there is not any question but he might have seen that. We have good days and bad days, like everybody else. I think Doctor McCann is here, one of our dispensary doctors, and he will say it is a very unusual thing to be down as low as eight, and it must have been a stormy night or something of that kind. We have had as high as thirty-four, and the dispensary today is taking care of ninety-three different patients in the city. We have four nurses; that is, the visiting nurse association does the work for us. They go round from house to house, sending people that they are suspicious of to our dispensaries.

We have three school nurses that are doing the same work, and four school physicians that are doing the same work, outside of the general practitioners in the city. So I believe that we have a line on almost every case that needs any assistance in the city of Brockton, and if he found eight cases one night there were nights when we had as high as thirty-four cases. The dispensary in Brockton has been running since 1909, and we did not need any orders from the State Department of Health, because we realized it was something that was needed long before they gave any such orders. The only thing that ever puzzled us was why a law was allowed to be on the statute book the number of years it was without ever being enforced.

Doctor Thompson: I should like to ask Doctor Phippen how much actual nursing service, like giving baths and that sort of work, the tuberculosis nurse should render. Should she attend to matters of personal hygiene in regard to a tuberculosis patient, give him baths, etc.?

Dr. Phippen: Ours give absolutely none. The board of health maintain a nurse in Salem who does that work, and there are other nurses who do similar things—district nurses. Our instructive nurse does nothing but instruct.

Doctor Morrow: I should like to ask how far the treatment in the dispensaries departs from the purely hygienic. How much is the dispensing of medicine practised in these dispensaries?

Doctor Phippen: I believe that the dispensary should not dispense at all. I think that in a few instances it may be necessary to provide certain things temporarily, but my idea of a dispensary is a preventive measure. Nearly every case has its local doctor. If it has not its local doctor, one of the dispensary staff can go and see that case in its house. But we do not dispense medicines generally.

Doctor Denny: I think the question which Doctor Pierce has brought up, of people who are more well-to-do than the charity case, is a very important one. Boards of health cannot absolutely neglect the people who are too well-to-do to come to the dispensary. I know that last year in Brookline we had some cases where well members of the family had been unnecessarily exposed, and one particular case where a child died as a result. We felt that we were very much to be reproached for our inactivity. I think the nurses in a great many cases can go in and interview the family. They can suggest such things as the examination of the well members, and can also keep in a general way a supervision of the children. I think if we are going to control tuberculosis we have got to go into a great many more homes than we have in the past.

Doctor Voss: It seems to me that it is a fundamental thing. As the local boards of health are charged with the health of the community, the obligation is on the local board of health. Under the law, the local dispensaries, whether they are private or have been established by the community, are subject to the rules and regulations of the local board of health. We cannot take away from the local board of health the power to conserve the public health, whether it is in one family or another, whether it is a rich family or a poor family. That fundamental obligation must remain with the local board of health under any condition.

Doctor Thompson: Doctor Phippen, I think, is quite familiar with the different tuberculosis dispensaries in Massachusetts, and I should like to ask how many of them have a paid staff or paid dispensary physician, and what his opinion is in regard to the physician having a salary or compensation.

Doctor Phippen: I don't think I can answer the question as to how many have a paid staff and how many have not. My opinion is that at present they had better not be paid. I feel there are plenty of men able and willing to volunteer their services, just as they would to an ordinary hospital. I don't know, I can't say for sure, but I think most of them are not paid.

Doctor Thompson: I don't see why, if the dispensary is established by a city, and the city pays the city physician, for instance, it should not pay its dispensary physician. I believe that as a rule one or two physicians should control the dispensary, and they should be paid, and they should be held responsible. You know who is responsible if you have one or two men. Hold them to strict accountability for the service rendered, and pay them a salary for it.

Mr. Stone: Mr. President, in reply to the last gentleman I would like to say that the State Department of Health, in approving dispensaries, has made certain regulations. One of the regulations is that the dispensary must be open at least one day, or part of a day, and one evening; another, that it must have at least one nurse, either giving full time or part time. And a third, that the dispensary must have three rooms, two or three—I think it is three—I am not sure,—

Doctor Thompson: Two.

Mr. Stone: Two, is it? And that these rooms must have outside ventilation. I am not familiar with any regulation in regard to the physician, whether he must be paid or not. I think there is no such regulation, but that this point is left for each community to settle. I believe in some instances the physicians are paid and in others they are not.

Doctor Phippen: The matter of interfering with private physicians in the management of their cases I think will not prove to be a serious one with any of you. It is merely a question of time and the tact of your instructive nurse. If your instructive nurse is a good tactful woman, you won't have any difficulty in having your doctors ask to have the patients go. I don't think there will be any difficulty.

Book Review.

Insects and Disease. *Handbook of Medical Entomology. By W. A. Riley and O. A. Johannsen. Ithaca: The Comstock Publishing Co., 1915. 9+348 pp., 174 ill., 8 vo.*

Under the title "Handbook of Medical Entomology," Professors Riley and Johannsen of Cornell University have produced an interesting volume that contains much more than is indicated by the title. Entomology is the science that deals with insects, but the authors very properly include not only the relations of these animals to human disease, but also the Arachnids, Myriapods, and other Arthropods. Moreover they supply figures and descriptions of the principal parasites of other orders which have insects or other arthropods for their intermediate hosts and may be transmitted by them to man.

Toward the end of the book there is an extensive analytical key for the identification of pathogenic arachnids and insects. This is arranged according to the zoölogical classification, is well illustrated, and should prove very useful.

The rest of the book, the greater part, is arranged with regard to the effects produced in man. After a brief introductory chapter, is one dealing with arthropods that are poisonous. In the discussion of the spiders the interesting fact is brought out that for the most part they are harmless, so far as man is concerned. The third chapter treats of the obligatory parasites including ticks and mites, lice, bugs, mosquitoes and flies, and the fleas. They are considered here only in relation to their direct effects on man. Many of these forms are given full treatment in four important chapters later in the book which treat of arthropods as essential hosts of pathogenic organisms.

One chapter is devoted to insects as intermediate hosts of tape worms and nematodes and three chapters to the transmission of pathogenic protozoa. Of the latter the first deals with mosquitoes in their relation to malaria and yellow fever, the second with Trypanosoma and Babesia and their hosts, and the third with the spirochaetes and their hosts. This last mentioned chapter includes a section on typhus fever and lice, the work of Plotz not having appeared when this book went to press. While accepting the protozoan relationship of the spirochaetes, the authors do not fail to call attention to the differences of opinion on that point. It is interesting to note in this connection how small a part the insects and arachnids play in the transmission of undoubted bacterial diseases. The plague and typhus fever are the only ones in which an insect is concerned otherwise than as a simple carrier, and, if the spirochaetes are protozoa, no arachnid has been shown to be an obligatory host of any bacteria pathogenic to man.

One chapter is devoted to poliomyelitis, pellagra, leprosy, verruga, and cancer. The theory that poliomyelitis is transmitted by the stable fly, *Stomoxys calitrans*, is discussed pro and con, and the explanation of pellagra as of dietary origin is noted.

In a final chapter directions are given for exterminating household insects. An extensive bibliography and an index complete the volume.

The book as a whole impresses one as being thoroughly up-to-date. The authors have brought together a vast amount of information from an immense number of scattered sources. The point of view is largely historical, the treatment is brief, but generally adequate. We regret to note the absence of the name of the discoverer of the transmission of plague from rat to man. There are a number of misprints, which will be corrected in the second edition that is sure to be required. In addition to those on the printed list, we note that on page 21 the sting of the scorpion is spoken of several times as the "bite." On page 224 Texas fever is spoken of as being "hereditarily transferred" to ticks of the second generation. Of course *heredity* in the biological sense has nothing to do with the case. It is a case of infection of eggs within the mother.

Finally it may be noted that the book is of convenient size, well illustrated, and well printed on paper that has a surface pleasing to the eye.

R. P. B.

Health Department Reports and Notes.

REPORTS.

Lancaster, Pennsylvania.

The 1914 report of the health department of Lancaster should be commended for the analysis of its morbidity statistics with which the report begins.

The board of health reports no active epidemic of any of the communicable diseases. The fact that there were 41 cases of typhoid and 121 cases of diphtheria in this city of 47,000, while not representing an extremely high morbidity, is nevertheless capable of improvement.

Deaths are tabulated by causes but no totals are given. This tabulation includes stillbirths. At another point in the book deaths are given by age periods and the total is given here as 678. If stillbirths are included in this total, the true crude death-rate is slightly under 14. If they are not included, it is slightly more than 14. The largest single cause of death in males was pulmonary tuberculosis; in females it was organic heart disease.

The unsatisfactory thing about this department report, as about many such reports, is that it fails to present to the reader at a glance the essential facts that he will be interested in knowing about the health situation in Lancaster. It does not say what the death-rate is. It does not make clear what was the actual number of deaths, exclusive of stillbirths, and it does not give the population. The infant mortality-rate is not given and it does not appear that the department is making any distinct efforts along this line. Lastly, the report fails to show the total appropriation of the health department for the period covered and does not give that always interesting figure—per capita expenditure for public health.

Spokane, Washington.

The health officer of Spokane, in discussing milk in his last annual report, says that the time is ripe for a reconstruction of the city's milk standard. He suggests three grades, all to be under 100,000 in bacterial count, with a passable fourth grade having over 100,000 which is to be regarded as suspicious. This is surely a very excellent standard. Certainly a great many cities would not venture to fix it so high.

The table of causes of deaths, which is presented in very readable form, shows by a glance at its column of totals that there were 1,170 deaths, exclusive of stillbirths. One page is given over to a comparative table of deaths, showing the number of deaths in each month of the year for the years 1907 to 1914, inclusive. The death-rate is shown for each of these years. In 1907 the death-rate was 13.40. It had fallen to 8.62 in 1914.

This report on the whole shows that the department presenting it is a very active one. The cover is more elaborate than used on most of the department reports but is probably justified by its attractiveness and will, no doubt, cause it to be read by more people than otherwise. The motto of the department is printed in gold on the cover: "Health is Wealth in Spokane as Well as Elsewhere."

Newport, Rhode Island.

The 1914 report of the department of health of Newport is small and compact; the tables of statistics are few and the recommendations and discussions are contained in a few brief letters of transmissal.

The health conditions in Newport are fairly good and the department is an efficient one, but its report must be classed with the large proportion of such reports which contain only a collection of dead facts and figures without the interpreting statements and careful and scientific arrangement which is necessary to give these facts and figures a vital, living meaning. It is important that the board of health should trans-

mit to the city council the information that four people died of whooping cough and twenty of tuberculosis during the year 1914. It is equally important that the report of the board should inform the council what death-rate this means and it should make sure that the council is able to appreciate the meaning of the term death-rate and know what rate to be satisfied with. It would in many cases be well to show by comparison the local death-rate with that of other cities having similar conditions to meet.

The attention of the council should be drawn to the per capita expenditure for public health and should be given the information which will enable them to determine whether they are getting their money's worth for the money spent, or if, as is often the case, not enough is being spent to secure any appreciable results this should be demonstrated. Vital statistics are the book-keeping of public health as well as the department accounts. All the books should be made to balance and should be easy to audit.

In the report of the inspector of milk for Newport it is stated that 66 per cent. of the bacterial plates examined exceeded the limit fixed by the board. This report does not say what limit the board has fixed. One wonders if the council knows.

NOTES.

A Good Record in Louisville.—The health officer of Louisville, Ky., in a recent issue of the bulletin of his department, points out with justifiable pride that not a single case of diphtheria or scarlet fever was reported during the month of July. The completeness of morbidity reports in Louisville is understood to be comparatively of a very excellent standard.

A month like this, even with some allowance for missed and unrecognized cases, is almost a unique record for a city the size of Louisville.

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Sanitation in Privies.—It is interesting to note with what perseverance the department of health of Virginia continues to devote space in its bulletins to the campaign for more sanitary privies. The June number of this bulletin was entitled "The Danger Zone on the Farm." There was a foreword calling attention to the danger from careless disposal of human excrement, and the rest of the twelve pages was given over to drawings and illustration of various forms of sanitary privies, together with directions for their construction. In addition to these there have been special bulletins describing the construction of particular kinds of privies. For example, the special bulletin issued under date of August 15 is entitled "The Pit Privy." The bulletin points out that the pit privy, if properly screened and covered, will, if regularly used by all the members of the household, prevent hookworm disease and all typhoid carried by flies. It is stated, however, that there are the following limitations upon the use of this type of privy:

"(1) The pit privy must never be located on a grade above or close to a well or spring; (2) the pit privy must not be placed above a limestone ledge; (3) the pit privy must be protected from rain-water, so that the contents of the privy will be kept reasonably dry and thereby will not seep into the surrounding ground; (4) the pit privy must not remain on the same site for more than two years at the very longest, as the earth around it will sooner or later become saturated with the filth."

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Phases in the Development of Public Health Work.—The following is quoted from a recent issue of the *Bulletin of the Chicago School of Sanitary Instruction* of the Chicago Health Department:

"The development of public health work has passed through three phases. The original conception controlling public health activities called for such protection of public water supplies and disposition of wastes as the crude ideas of science of the times dictated. This stage persisted from ancient times till bacteriology became a science.

"With the discovery of the bacterial cause of many of the infections, public health in common with the private practice of medicine took cognizance of the newer developments and the horizon of its outlook rapidly broadened. From being a mere abater of gross nuisances the health

officer's duties became more and more exacting. With the rapid development of medical and engineering knowledge, the public demand that water supplies be safe at all times, that contagion be reduced to a minimum, that infants be guaranteed safe conduct to maturity—all these and many other demands—have occupied the attention of the health officer. Under this conception of duty the average age of civilized men everywhere has been lengthened. But as the death-rates from contagion diminished, the deaths from pneumonia, cancer and the so-called degenerative diseases—arterio-sclerosis, heart disease and nephritis—increased.

"There is an insistent demand, therefore, that health officers undertake a campaign of education to delay to as late an age period as possible, the incidence of the latter diseases. So far as known, these diseases are intimately related to the life habits of their victims, who can only hope to escape until a 'ripe old age' by an habitual observance of the rules of personal hygiene."

This is followed by an endorsement of the Life Extension Institute's plan of periodic physical examination and by a table of statistics of chronic nephritis death-rates.

*

Treatment of Bee Stings.—Almost every department bulletin prints something every summer or every month during the summer about mosquitoes and flies, but it is rather unusual to find anything about bee stings. The July bulletin of the Bureau of Health of Rochester, N. Y., contains the following interesting paragraphs regarding bee and wasp stings:

Bee Stings—Wasp Stings.

"Excepting an attack of poison ivy or a severe sunburn, nothing is so momentarily painful as a bee sting in a susceptible subject. Experimentally, we know that a minute drop of the poison exuded by a bee through its sting will produce the most exquisite local pain and general bodily discomfort in a susceptible individual. Some persons, even bee experts, are more highly susceptible to stings than others. It may be of interest to know that susceptible persons may be protected from bee stings by the use of a vaccine made from the material extracted from the honey bee. It may also be interesting to know that bees or wasps will more readily attack persons dressed in dark clothing than those dressed in light clothes, and that if one is dressed in light clothing with a dark hat or band, bees will more readily sting through the colored part of the clothing than through that which is light.

"When a person is stung by a bee, the sting is pulled away from the abdomen of the bee and enters the skin of the individual stung. Just as soon as the sting is inflicted the person usually rubs or scratches the place that is stung, and in this way causes the sting to penetrate deeper into the flesh and the poison in the sting is further exuded by the rubbing or scratching of the fingers against the stung part. *Do not rub a bee sting.* If your eyesight is not good enough, get a magnifying glass and take a knife or fine needle and try to get the bee sting out of the skin. You can see it as a flesh-colored, irregular, needle-shaped body lying in the skin at the point where the sting was inflicted. Then touch the sting with weak ammonia or spirits of camphor, or with ordinary tincture of iodine, or with a mixture of tincture of iodine, 2 drams to 10 drops of carbolic acid.

"A hornet sting may be removed in the same way as the bee sting and then washed out with alcohol, because the poison of the hornet sting is soluble in alcohol.

"If none of these substances are to be obtained the sting may be touched with moist soap, so that a film of soap will be left over the sting. This will relieve pain. But first and most important—remove the sting with a knife or needle."

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The Physician and the Public Health.—It is an old story that the health department of a community cannot be of the greatest benefit to the public it serves without the coöperation of the local physicians, but it is a story which deserves retelling, both to the physicians who may be slow to lend this coöperation as much as they should, and to the health officers, who may for the moment lose sight of the importance of having the good will of the practising physicians and through their own fault lose some of this help.

The bulletin of the Connecticut State Board of Health quotes, from an article by Dr. J. W. Trask of the United States Public Health Service, a few remarks on this subject which deserve reproduction here for the benefit of those who may not have seen them:

"To control disease the health department must know when disease exists, where it exists, and under what conditions it exists. This knowledge can be obtained only through the reports of the notifiable diseases made by physicians; the practising physician is therefore an essential part of the health department. This is true whether the physician recognizes it or not, and whether the community recognizes it or not. The physician is the outpost, the picket that must give to the health department information of the approach of the enemy, his numerical strength, and his armament.

"Coöperating with an efficient health officer, the physicians of a community have it within their power to make the efforts of the health department successful or to make their success impossible. The practising physician who fails to report a case of communicable disease thereby endangers the welfare of the community and exposes others to the danger of contracting the disease. He is neither a good physician or a good citizen and must be considered as opposed to the principle of the control of disease and the protection of the people for which the health department stands.

"With the help and coöperation of the practising physician the health department can do much to prove the truth of Pasteur's statement that it is within the power of man to cause all infectious diseases to disappear. Without the coöperation of the practising physician the health department can do but little."

Public Health Notes.

Why Babies Die.—The following short discussion of infant mortality from diarrhea appears in the *Medical Officer*, London, under the title given to this note:

"Diarrhea was the cause of twenty-four deaths in the borough of Batley during 1914, and Dr. G. H. Pearce, M. O. H., states that so far as the deaths of children are concerned—nineteen out of the twenty-four—practically every one of these fatalities should never have occurred had the simple directions been carried out which are continually being given to mothers of infants both by printed pamphlets and by personal advice through the medium of the health visitor. The average yearly number of lives wasted in Batley through this disease since 1890 has been thirty-eight, and for the whole of that period 968 lives have been uselessly sacrificed to the prevalence of what is known as one of the filth diseases. Zymotic enteritis is usually confined to the months of July, August and September, but it was remarkable that in 1914 the first death occurred on June 9 and the last on December 8. There were deaths in each of the intervening months, eleven of them taking place in September alone. The amount of diarrhea in any town is usually looked upon as an index of its sanitary condition. In Batley, owing to measures having been taken by the corporation during the last few years, the sanitary conditions have been considerably improved, and had the mothers of infants improved their methods accordingly there is no doubt the annual death roll of this complaint would be much less. Dirty women, dirty houses, long tube bottles, food left about the whole day on the table, together with its pollution by flies, cats and dogs, is a common cause of the disease. Dr. Pearce states that these conditions are found in many of the houses of the town. Bottle-fed children, as is well known, are particularly susceptible, and it is quite the usual thing to go into homes where the milk for the baby, after standing exposed to pollution by dust and flies for hours, is then put into a dirty long tube bottle, frequently sour, and given to the child. As Doctor Pearce says, it is remarkable when all the circumstances are considered that many more infants do not die than is actually the case. Of the nineteen fatal cases among children, seventeen were fed on the bottle and only two on the breast. In each of these latter cases the home conditions were far from desirable.

"The health visitor all the year round instructs mothers how to feed and bring up their infants, and from May to October distributed leaflets on the fly danger and the risk of diarrhea, to young children. A great improvement is said to have been the result, but evidently there is much to be done yet. Efforts are made

to enforce compliance with that portion of the nuisance by-laws of the borough which requires all manure to be removed at least once every seven days. Doctor Pearce says, truly enough, that it is a simple matter to remove manure once each week, but it is remarkably hard to get owners of animals to banish their old fashioned ideas, particularly if it means a little extra trouble."

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A Protective Therapy for Mumps.—It is evident from recent medical practice that the blood of one individual may be employed as a therapeutic agent for another without danger, and advantages are thus secured sometimes which could be obtained in no other way. Such a practice was resorted to at the Hebrew Infant Asylum of New York recently in an attempt to control an epidemic of mumps. Care was taken in selecting the donor of the vital fluid. Whole blood was used and was injected intramuscularly. The blood was aspirated in the usual way and immediately injected into the patient so that there was no need of adding any anticoagulant.

Various tables show the results of this treatment. Of the seventeen children inoculated, all of whom were exposed to the disease, none became ill. In wards where the children were not so protected one-third or even one-half came down with the disease. The authors believe this treatment to have been effectual in checking the epidemic and assert that it is a practical preventive measure which may be resorted to in the home. Experience seems to indicate that the blood may, with advantage, be obtained from the donor even before the parotid swelling has disappeared. The long incubation period of mumps allows the use of a protective injection some days following exposure. The duration of the acquired immunity probably outlasts the danger period of infection.—Alfred F. Hess, M. D., *American Journal Diseases of Children*, August, 1915.

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Risks from Tuberculosis Infection Retained in Books.—The following is a summary of an article by Henry Kenwood and Emily L. Dove in the *Lancet* of July 10:

Experiments were undertaken to test the possibility of transmitting living tubercle bacilli in an infective form by means of books used by tuberculous patients. Patients were allowed to cough upon sheets of paper and these were then washed and the washings injected into guinea-pigs. An interval of twenty-four hours elapsed between the contamination and wash of the papers. Tuberculosis was produced in pigs from eight of the pieces of paper, while six papers caused no infections. The test was repeated with papers kept one month after their contamination; guinea-pigs inoculated from these papers manifested nothing. Similar tests were made with thumb marked pages from books from the public library which had been recently used by tuberculous patients; no infections resulted. Sheets of paper were then thumb smeared with diluted tuberculous sputum and six of these were washed twenty-four hours later and the washings injected into as many guinea-pigs. Of these one died of sepsis, four manifested tuberculosis, and one was uninfected. Six other sheets similarly treated were kept for a month, and of these only one produced tuberculosis in guinea-pigs. Further, it was found that the exposure of such contaminated sheets to moist heat at 95° C. for half an hour served to kill all the tubercle bacilli. The same result was secured with pieces of contaminated handkerchief immersed for fifteen minutes in water which had been brought to the boil and which was then removed from the flame. From these results the authors conclude that the danger of transmitting tuberculosis through the use of books by infected persons is very slight and can be practically removed by the temporary withdrawal of such books from circulation. Moist heat is a simple means of completely destroying tubercle bacilli on books which would not be hurt by an exposure for fifteen minutes.—*New York Medical Journal*, July 31, 1915.

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A New Fixing and Hot Staining Apparatus.—The need of a clean and neat apparatus for hot staining with carbolfuchsin has apparently been met by a device which the *Journal of the American Medical Association*, July 31, 1915, describes as follows:

"The apparatus (a description of the twenty-slide type used by us is given), which can be made to accommodate any number of slides, multiples of two up to about twenty, consists of a large asbestos wood frame with base which will withstand a red heat without destruction.

In the bottom of the box-like frame is contained a sliding metal shelf to be filled with sand for catching any carbolfuchsin drippings and to aid in reflecting all the heat upward from the heating units, of which there are ten (one for every two slides). These units, which are easily replaceable, are simply made of 'lavite' wound with nichrome wire (size 32), which will give the proper heat when connected with a 110-volt lighting circuit. (The nichrome wire used was tested for solubility in boiling carbolfuchsin solution and found to be insoluble.) In order to regulate this current more accurately, however, there is included in the circuit a small suitable rheostat. For the purpose of leveling the apparatus so that it may stand on any laboratory table, the two front legs of the base are made of adjustable leveling screws. The slide carriers are nickel plated brass frames made to fit in the asbestos frame at a suitable height above the electrical units, and with a handle at each end for moving it about, and suitable grooves so that the slides can be removed with forceps. When large numbers of slides are to be stained, three of these slide carriers are used, being placed in small trays made for the purpose. In this way it is possible to do continuous work as, for instance, fixing and staining one set while decolorizing, etc., the other sets. The trays can also be conveniently used in decolorizing and contrast staining by merely carrying to a nearby sink suitably arranged. A set of fuses is arranged on the apparatus so that there is no danger of accidental short circuit and burning of the operator. The apparatus is fireproof, being made entirely of metal and asbestos wood, as approved by the National Board of Fire Underwriters. This apparatus has been found to be a tremendous time saver by all who have used it in our laboratories.

"The apparatus can be obtained complete (sizes two to twenty slides) from A. de Khotinsky, 6026 Drexel Avenue, Chicago."

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The Destruction of Fly Larva in Horse Manure.—Bulletin No. 245, of the United States Department of Agriculture, July 20, sets forth recent advances along this line. It had already been known that borax was an effective larvicide and could be used at a cost of 0.42 cents per bushel. This treatment, however, rendered the manure of slight value for fertilizing purposes. Recent experiments have shown that powdered hellebore (from Veratrum album and Veratrum viride) is an efficient larvicide and free from a deleterious action on the fertilizing value of the manure. The cost of treatment, which calls for one-half pound of powdered hellebore to ten gallons of water applied to eight bushels of manure is 0.69 cents per bushel.—*Journal American Medical Association*, July 31, 1915.

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Vaccine in Whooping Cough.—As the result of an extensive investigation of the prophylaxis and treatment of whooping cough carried on by the Research Laboratory of the Department of Health of the city of New York, Luttinger draws the following conclusions: (1) Pertussis stock vaccines as prepared by the Bureau of Laboratories seem to have a prophylactic value when given in high doses. (2) In the treatment of pertussis, these vaccines seem to have shortened the duration and severity of the paroxysmal stage; the average duration of the whoop being twenty-five days, compared to forty days of those treated with drugs. (3) Further experiments with the view of obtaining more effective vaccines and a closer coöperation of the profession in public health education may help in the eradication of pertussis, this scourge of childhood which kills yearly ten thousand American children. In view of these results, the Bureau of Laboratories seeks the collaboration of private practitioners in more extensive tests of these vaccines. The necessary quantity accompanied by direction for administration and a history card will be given to any city practitioner who promises to report the results obtained. In doubtful cases the sputum may be sent to the research laboratory for diagnosis. To be of any value, the sputum must be obtained early in the disease from the bronchus. The characteristic sputum is obtained by inducing a paroxysm by tickling the child's fauces with a wooden tongue depressor, and appears as a grayish white tenacious plug of mucus.—*New York Medical Journal*, July 31, 1915.

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An Important Ruling on the Harrison Law.—"Since the Harrison law went into force, frequent inquiries have been made," says the *Journal of the American Medical Association* "as to the quantity of drugs which a physician was justified in prescribing or dispensing. Obviously,

the quantity necessary in chronic cases or in the treatment of drug habitués differs materially from the quantity permissible in an ordinary case. The law makes no provision on this point, except to provide in general terms that, whether prescribing or dispensing, all acts coming under the scope of the law must be in good faith and not to evade the purposes of the act. It has been evident that some supplementary ruling on this point would be necessary. The Commissioner of Internal Revenue has just issued a ruling, dated May 11, which provides that 'where a physician, dentist, or veterinarian prescribes any of the aforesaid drugs (those included in the provisions of the Harrison law) in a quantity more than is apparently necessary to meet the immediate needs of a patient in the ordinary case, or where it is for the treatment of an addict or habitué to effect a cure, or for a patient suffering from an incurable or chronic disease, such physician, dentist, or veterinary surgeon should indicate on the prescription the purpose for which the unusual quantity of the drug so prescribed is to be used. In cases of treatment of addicts, these prescriptions should show the good faith of the physician in the legitimate practice of his profession by a decreasing dosage or reduction of the quantity prescribed from time to time, while on the other hand in cases of chronic or incurable diseases, such prescriptions might show an ascending dosage or increased quantity. Registered dealers filling such prescriptions should assure themselves that the drugs are prescribed in good faith for the purpose indicated thereon and if there is reason to suspect that the prescriptions are written for the purpose of evading the intentions of the law, such dealers should refuse to fill same.' Under this ruling, physicians must place on their prescriptions, whenever, for any reason, an unusual quantity of opium or cocaine is prescribed, a statement of the reasons for such an order. If the physician and patient are acting in good faith, it is difficult to see any objection to such a provision. There will, of course, be some sensitiveness on the part of secret drug addicts to having their weaknesses made a matter of record, but this can hardly be avoided in any plan which will separate the genuine from the spurious demand for these drugs. The ruling of the commissioner will clear up a point on which there has been much discussion. As the *Journal* has constantly stated, the object of the Harrison law is to secure publicity in the use of habit forming drugs and to effect the prosecution and punishment of all persons using them for illegitimate purposes. Compliance with this ruling will relieve physicians of responsibility and will make the prescribing or dispensing of unusual amounts of these drugs a matter of record."

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Second-Hand Clothing and Communicable Disease.—The August number of *Public Health*, London, contains an article on the relation of second-hand clothing to the spread of infectious disease.

It is pointed out that there are four branches of the second-hand clothing trade:

1. Pawn shops.
2. Second-hand clothes shops.
3. Rags and bone dealers.
4. Buyers of second-hand clothing at private houses.

The author states that parents often take advantage of the fact that a child is ill to pawn some of the garments, quite regardless as to whether the child is suffering from an infectious disease.

The author makes the following interesting statements:

"One of the first cases brought to my notice was that in which a man had sent his daughter to pawn the skirt and some of the bed-clothes from the bed of his wife, who was lying ill with what ultimately proved to be enteric fever. This woman died, her daughter developed the disease and recovered, but the pawnbroker's assistant who took in the clothing contracted enteric fever and died from the effects of it.

"This was a case of undoubted direct infection from the woman to the assistant, but the husband could not be dealt with, as he had at the time no knowledge of the complaint from which his wife was suffering.

"Infection from scarlet fever, measles, whooping cough, etc., is much harder to trace, as it is difficult to induce parents to admit dealings with pawnshops." . . .

"Twice in one week a pawnbroker in one of the districts sent word to the health department that he had refused to take in bundles from certain families, as he had heard that there was 'fever' in the house.

"On making inquiries in both cases, infection was found to be present in the child whose clothing had been sent, and in both cases this was the first intimation the department had had of it. Now, this goes to show two things: first, that the pawnbrokers are careful, and do what they can to coöperate with the health department; but it also shows that there is a risk of the spread of disease in this way.

"Quite recently two cases have occurred in which it was found by our inspectors that clothing and boots had been pawned after a child had been taken ill with scarlet fever, and before the parent had become aware of the nature of the complaint."

In his conclusion the author makes the following statement regarding the remedy for this situation.

"All such business as those of second-hand clothes dealers and rag-gatherers should be licensed in every town, and certain conditions regulating these trades should be laid down."

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Method of Destroying Lice and Body Vermin.—A British medical journal, June 19, publishes an article of Kinloch dealing with the above topic.

"For practical purposes, Kinloch states, the destruction of lice and nits is best secured by immersion of verminous garments and bed clothes in a petrol or benzene bath. Danger from fire and waste of petrol are avoided by using such a bath and extractor as are employed in a dry-cleaning apparatus. In such an apparatus 90 per cent. of the petrol or benzene is recovered for future use. A petrol or benzene bath is necessary, especially for uniforms and woolen garments generally. In cases in which the clothing is such that it is not injured by immersion in water, steeping the garments for half an hour at 12 C. (54 F.) in a soap solution containing 2 per cent. of trichlorethylen or 10 per cent. of tetrachlorethan secures destruction of lice and nits. For cleansing the body itself, bathing or sponging with soap solutions containing 2 per cent. of trichlorethylen or 10 per cent. tetrachlorethan gives the best results."—*Journal American Medical Association*, July 17, 1915.

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How Not to Economize.—The *Medical Officer*, London, for July 31, devotes a column to the discussion of this topic. The article refers to the withdrawal of the vote of £25,000 for research in connection with the prevention, diagnosis and treatment of disease, stating that Mr. Montague, secretary to the Treasury, pleaded in vain for the scheme but that the members of the House of Commons ignored his warning that it was necessary for the public health. The writer of this article continues as follows:

"The whole subject of retrenchment will have to be very carefully cons dered if trouble is to be avoided when our fighting men return from the war. Those who have risked their lives and bled for England will have a wider outlook than formerly when they return to civil life. We hope and believe that they will be less satisfied to live in squalid surroundings, and that they will demand sanitary housing where they can rear healthy families in decent surroundings. Whatever economies are necessary after the war, we doubt if our local authorities will be safely able to reduce an expenditure on housing and sanitation which has never been excessive. They must find other ways of saving if they expect to see a contented people in the difficult days ahead of us. For our part we are prepared to argue that, following on the loss of so many of the flower of our race, it would be the truest economy to spend freely on maternity and infant welfare schemes, on the medical treatment of school children, on the sanitary housing of the working classes and on the prevention of disease. Let us by all means practise rigid economy in the matter of luxuries, but let there be no stinting of expenditure essential to the health and the well-being of our people."

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The Detection of B. Coli.—Mr. George W. Fuller, chairman of the Engineering Section of the American Public Health Association, in an address presented before the Mechanical and Engineering Section of the Franklin Institute of Pennsylvania last November, pointed out that the bile presumptive test for B. coli, while markedly helpful in all cases, may in some instances lead to a certain amount of injustice against very important water supplies. In his argument Mr. Fuller quotes the following from an article in the *Journal of Infectious Diseases* for 1911:

"B. coli is found in sewage, and therefore its presence is significant; but, as newspaper re-

porters and other persons are inclined to magnify conditions, the officers in charge of purification works should be careful to identify suspicious organisms as true B. coli before throwing suspicion upon their plants and prejudicing the minds of the people."

Mr. Fuller in closing this section of his paper says:

"It seems important to have the standard methods of bacterial water analysis thoroughly reviewed and brought to date. And it is understood that the American Public Health Association, through its Laboratory Section, appointed a new committee to deal with this subject. (Jacksonville [Fla.] Convention, December, 1914.)"

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The Prevention of Syphilis.— The *New York Medical Journal*, July 17, 1915, contains an article by Dr. A. W. Stillians dealing with the above topic. He cites statistics showing that from 6 to 15 per cent. of the population of various countries are syphilitic. Life insurance statistics and also hospital records credit syphilis with from 7.5 to 18 per cent. of all deaths. Its death-rate, according to White, is greater than that of any other disease except possibly malaria. And yet the fact that the amount of this disease in the United States army has recently been reduced by one-half gives encouragement for a campaign against it. The work in the army has consisted of the education of the troops by lectures and literature and by the adoption of stringent measures for those soldiers who contract the disease and allow it to go untreated. The author believes that a similar campaign should be carried on among civilians. His conclusions in part are as follows: "Among legislative measures needed, an act making it a crime knowingly to transmit venereal disease and an act requiring a certificate of health before marriage are important. Prevention by means of the Metchnikoff ointment should be advocated for all those who expose themselves to the danger of contamination."

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Every Nurse a Public Health Nurse.—The *Nurse* for August contains the following editorial:

"Next to the physicians, those members of a community most familiar with disease are the nurses. Their theoretical training includes considerable study of the causes of disease, and their experiences with the unfortunate victims of infection or epidemic cannot fail to emphasize the importance of the relation between cleanliness and health in the community. The nurse's knowledge, moreover, gives her a position of authority in public health work. Her opinions, founded on experience, carry considerable weight with the average citizen. And in no better way can she assist in public health work than by teaching cleanliness, both by precept and example.

"Cleanliness is the most emphasized word in the hospital and training school. The nurse has material in plenty, therefore, for a series of lectures on the importance of keeping the community clean. Most of the summer diseases, typhoid for example, are the result of filth and unhygienic conditions. Every householder who fails to keep his premises clean is a menace to the community. If he allows rubbish to accumulate or neglects the drainage on his property or keeps a dirty stable, the act constitutes a nuisance under most of the health codes, and the matter should be brought to the attention of the health authorities, for it is a source of disease. Some other sources of disease which health boards are striving to eradicate are impure milk, dirty streets, negligent handling and disposition of garbage, unscreened accumulations of stable refuse, and pollution of streams and other sources of water supply. Every public-spirited nurse will do well to consider herself a self-appointed public health nurse to the extent of coöperating with the health board by bringing to light wherever possible the unclean places which menace the health and are conducive to an increased death-rate in her community."

It will be noted that this editorial urges the nurse to coöperate with the health authorities by bringing to light unclean *places* which menace health. It is worth noting in this connection that the nurse, whether she be by vocation a public health nurse or whether she be serving private patients, is more likely to find uncleanliness in patients than she is in places. We all see dirty places which it might be argued we could "do something about." The nurse does work which reveals personal uncleanliness and neglect of hygienic routine. Is it not possible that by the proper use of tact and argument

she could discharge her patients with a better knowledge of the essentials of personal hygiene and a greater interest in observing them?

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Heredity in Relation to Cancer.—The *Interstate Medical Journal*, July, 1915, publishes an article by Maud Slye setting forth the result of extended study upon the inheritance of cancer among mice at the Cancer Laboratory in Chicago. She has noted that the rapidity of tumor growth varies with that of the growth processes of the individual. The conclusions from this important study follow:

"The clinical behavior of cancers in this laboratory is opposed to the theory of infection.

"1. Infection takes the weak individuals. Cancer selects the strong ones.

"2. Reduction of feeding and consequent lowering of resistance increases liability to infections; it lowers the cancer frequency.

"3. Vigorous growth processes are necessary for tumor growth. They militate against infections.

"4. A very slight infection will kill a pregnant female. Tumor growth is retarded by pregnancy.

"5. The results of these experiments show cancer to be hereditary in the strict sense. The infections common among my mice are no more liable to occur in one family than in any other if the individuals are separated from one another; whereas cancer crops out no matter where the mice are kept.

"6. The infections common in this laboratory spread not only through the cage, but to adjoining cages. The most careful and long continued experiments have failed to show a single case of transmission of cancer by contact in the same cage or in adjoining cages.

"7. If an infected mouse dies in a cage and is partly eaten before it is removed, every mouse in the cage is liable to be swept off by the same infection. Over and over again, the cancers of mice have been eaten by their mates or by mice placed with them as controls. I have never had a case of cancer in such controls. Portions of the cancer and of the viscera of dead cancerous mice have been systematically fed to mice in control cages without a case of cancer in such controls.

"8. Cancer is a disease of middle and advanced age when the normal growth processes are confined to regeneration and reproduction. Infections are diseases of early life, when growth processes are largely accretions in quantity and in complexity.

"Whether or not cancer shall prove to be an infection, it has one profound difference from any infection known to man. It follows the laws of heredity with an inevitableness which makes it a character that can be manipulated. It can be bred into and out of strains at will. It can be put into a strain where it has never existed and it can be drawn out in extracted lines which can produce nothing else; or it can be bred out of a line one side of which originally carried 100 per cent. of cancer.

"Cancer is not transmitted as such, but rather as a tendency to occur from a given provocation, probably in the form of over irritation. The elimination as far as possible of the causes of over-irritation to the tissues of all individuals of high cancer ancestry should go far to eliminate the provocation of cancer; and the eugenic control of matings so that cancer shall at least not be potential in both sides of the hybrid cross ought to eventuate in a considerable decrease in the frequency of human cancer."

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Pasteurization of Milk.—"Although the pasteurization of milk has become a familiar process in various parts of the United States and is highly lauded in many quarters as an admirable safeguard of the health of consumers," says the *Journal of the American Medical Association*, "there still is considerable misconception regarding the results actually accomplished. The real function of pasteurization, that is, its actual effect on the milk involved, is not understood so adequately or accurately as it ought to be. Those least conversant with the underlying facts often believe that the procedure destroys all the microörganisms present in raw milk; the results attained are confused with what is attempted in complete sterilization of milk by more vigorous methods. The more rational assumption, on which the current practices in general are based, is that pasteurization of milk, by heating it to a temperature of from 60° to 63° C. (140° to 145.4° F.) and holding it at this temperature for from twenty to thirty minutes, serves to destroy any bacteria of diseases regarded as transmissible by milk. The use of higher temperatures for shorter

periods is now more generally avoided because it is believed that undesirable chemical changes are more likely to take place in milk treated in this way, and more especially because higher heating destroys an undue proportion of lactic acid bacteria, while the spores of certain micro-organisms which decompose the proteins of milk are not destroyed. As a result, the milk may subsequently become unwholesome from putrefactive change before it becomes sour as a result of the acid-forming bacteria.

"Realizing, then, that pasteurization is never expected to destroy all bacteria in milk, one is prompted to ask what margin of safety against survival of undesirable living organisms remains at the temperatures and during the periods currently advised for heating the milk. It is said that the presence of colon bacilli in pasteurized milk is generally interpreted as meaning either that the milk was not properly heated or that it was reinfected after pasteurization by careless handling. This interpretation is based on the low thermal death point of cultures of B. coli. In the laboratories of the Dairy Division of the Bureau of Animal Industry at Washington, Ayers and Johnson have ascertained the thermal death point of many cultures of colon bacilli isolated from numerous typical sources of contamination, such as the excrement of man and cattle, flies, milk, cream and cheese.

"It is important from a practical standpoint to learn that 62.8°C. maintained for half an hour is a critical temperature for most colon bacilli. It seems desirable, however, to emphasize the fact that though there is a low 'majority thermal death point,' a few cells often may survive this. Under the circumstances pointed out, the thermometer needs careful watching, and the pasteurization process calls for intelligent execution in order to produce dependable results. The presence of a large number of colon bacilli immediately after the heating process may indicate improper treatment of the milk.

"The government bacteriologists have reached the conclusion that if milk is pasteurized at a temperature of 65.6°C. (150°F.) or above for thirty minutes, they would not expect, from their results, that any colon bacilli would survive. Consequently, under such conditions the colon test for the efficiency of pasteurization may be of value. It must be remembered, however, that a study of more cultures may reveal strains of colon bacilli that are able to survive this and even higher temperatures."

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A Law with Teeth.—The following is an editorial referring to the Harrison anti-narcotic-drug law which appeared in the *Boston Herald*:

"Plainly there are teeth in the Harrison law which went into effect nearly six months ago as an attempt to check the drug evil. The difficulties that this federal law have put in the way of drug victims, when they attempt to get the narcotics that their diseased systems crave, are indicated in the rush of the victims to the various homes and sanatoriums that hold out a promise of a cure. The superintendent of one such reputable institution, here in New England, says that in the last six months he has been overwhelmed by applications and has had to turn away hundreds that he had no accommodations for.

"As long as the drug fiends could get their regular supply of 'dope' they drifted along contentedly enough toward their miserable fate. When the supply was cut off, they frantically sought a cure from the mad craving that they could not satisfy. Some cases yield to treatment—many do if taken early enough—but many are beyond cure. An unusually large crop of suicides shows the refuge that the uncured and uncurable seek in their agonized desperation. In many cities the police and the hospital heads have this same story to tell. The tragedy of the pitiable creatures who are the immediate victims of the new law may well stir any heart to pity, but the welfare of society demands that the sale of the narcotic drugs be far more closely supervised and regulated than in the past.

"When medical men say that five times the quantity required for the legitimate trade, not to mention the quantity smuggled, has been imported in recent years, we get some conception of the growth of the evil that has so many thousands, probably hundreds of thousands, in its grip. The country districts have their victims, as well as the city slums. Every community knows them—sad wrecks of what might have been men and women. The hardships brought them by the new law, which effectively supplements the widely varying state laws, cannot be weighed against the greater need to fight a menace that has become worse here than anywhere else in the world, except in China itself."

Industrial Hygiene and Sanitation.

Hygiene Pointers for Workers.—Dr. W. Gilman Thompson has contributed a valuable article to the July issue of the *Dodge Idea*, entitled "Hygiene for the Workman as a Doctor Sees It." In this article a number of topics are treated briefly but with proper emphasis on the important points. There are instructions which are applicable to the personal hygiene of any one and, on the other hand, there are special directions for those whose work subjects them to special conditions and special risks. The following paragraph is for the benefit of those who work in dusty atmospheres:

"All workers in dusty atmospheres should frequently cleanse the mouth and nose. For the mouth and throat, a wash and gargle of either common salt or borie acid solution should be used, in strength of about half a teaspoonful to the cup of water. For the nose a warm salt solution of the same strength may be used by inhaling a little of the fluid poured into the palm of the clean hand, or poured with a spoon into the nostrils and blown gently out again. In the nostrils the dust will thus be prevented from encrusting with the mucus and causing ulceration and chronic catarrh."

This paragraph, while it emphasizes the necessity of properly fitted shoes for those who are obliged to stand for a long while at a time, is nevertheless a point which might well find a place in the bulletin of state or city department of health or in a school physiology:

"It is distinctly worth while for workmen to keep the feet in good condition, for this does much to prevent fatigue in those who have to stand through long hours. Ill-fitting shoes, which tend to produce flat-foot, blisters, bunions, etc., greatly impair efficiency, and by pain or discomfort which they cause give rise to secondary troubles of various sorts. Female employes especially, who stand all day as in tending looms or other machines, should keep an extra pair of easy shoes to work in, changing them for street shoes on going home. Stockings with holes or hard seams should not be worn."

On the first page of this article there is the following extract from Doctor Thompson's book on "Occupational Diseases," printed in larger type than the principal text and placed in the middle of the page:

"'Exercise for health rather than for strength.' That in a nutshell may be said to be a precept of some of our large industries. By mottoes distributed throughout the factory, by books, by leaflets, by movies, by health talks and in innumerable other ways the need of systematic bodily exercises is being impressed on workers, both in office and in shop. Emphasis is probably laid more on the gentler exercises, such as in calisthenics one takes on arising in the morning, than on games. But games are encouraged in every possible way, because they are a means of furnishing fresh air, exercise, and outdoor life. The good results from every viewpoint are apparent. Fewer are sick; all are more efficient."

*

Healing of Wounds.—This note is taken from *For You*, the excellent welfare bulletin of the Ford Motor Company:

"Wounds heal very fast if they are clean. Clean means without dirt, and also clean of germs.

"Germs are often on the skin and on the tool, or whatever causes the wound. When they are not cleaned out of the wound at once, blood-poisoning may result.

"The best way to prevent blood-poisoning is to clean the wound at once. Then keep it clean by covering with a clean piece of linen which has been boiled, or a piece of sterile gauze, and hold firmly in place with a bandage.

"To clean a wound, wash with gasoline, taking plenty of time and using a piece of clean linen to wash with. Clean the skin all around the wound and wash into the wound. Then paint the wound and the surrounding skin with tincture of iodine. Iodine kills the germs at once.

"If there is no gasoline or iodine handy, wash the wound thoroughly with alcohol and put on a piece of clean linen wringing wet with alcohol.

"No cut is so small that you can afford to neglect it."

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Hygiene for Office Workers.—An insurance company is not what is usually suggested when industrial corporations are mentioned. Nevertheless, some of the welfare work done by such corporations, as the Metropolitan Life Insurance Company, comprehends many activities which deserve the consideration of heads of welfare

departments in more essentially industrial plants.

The Metropolitan Company has issued a booklet describing the welfare work which it conducts for the benefit of ts employees.

Some of the features of this work are:

The Staff Savings Fund, to which the company, in order to encourage employees to contribute to the fund, subscribes 50 per cent. of the employees' deposit—this bonus, however, may not be withdrawn until the employee has been in the service for twenty years:

The Luncheon Service, which provides without cost to the employees a complete lunch daily. The luncheon service is extended to the staffs of the printing, mechanical, and commissary departments, as well as to the clerical force. The period allowed for luncheon is thirty-five minutes.

A Disability Insurance has recently been inaugurated. The company pays one half of the premium for the disability insurance, which provides for benefits of two thirds of the salary for a period of twenty-six weeks, half benefit for 234 succeeding weeks, and quarter benefit thereafter until the insured reaches the age of sixty-five.

Medical Service is fully provided for all. Applicants for positions in the home office are subjected to a careful medical examination. A reëxamination is made annually in order that serious diseases may be discovered in the early stages and proper remedies suggested. For sick employees the company provided in June, 1911, a completely equipped dispensary, consisting of a nurses' office, two service rooms, one rest room for men and one for women, and an isolation room for the treatment of accidents.

The dispensary is open during office hours, *i. e.*, 9 a. m. to 4.30 p. m.; Saturday, 9 a. m. to 1 p. m. The medical directors, their assistants and three graduate nurses are in charge. Treatments include necessary medical and surgical care, physical examination, and instruction in hygiene. Physicians, including a specialist for eye, ear and throat, hold daily clinics. A dental clinic has recently been added and the teeth of employees will be examined semi-annually.

If clerks, however, develop tuberculosis, they are sent to the company's sanatorium at Mt. McGregor. The company's interest in a case does not cease after the clerk is able to return to work. There are now twenty-two ex-patients at work under the supervision of the medical department. These patients are given extra diets daily—morning and afternoon. It is possible, therefore, to observe these arrested cases twice daily. In this way, any change in general appearance or return of temperature may be noted and immediate action taken. Temperature, pulse and weight are recorded bi-weekly.

During the year 1914, 23,098 visits were made to the dispensary by 1,948 patients. Of these 67.3 per cent. were women and 32.7 per cent. were men; 14,573 medical and 8,525 surgical treatments were given. The daily average was 83.75 treatments. Two hundred and eighty-eight patients were referred to hospitals and other institutions for special treatment.

In addition to these more purely health activities the company maintains a social service and a number of educational classes. A gymnasium is provided and there is an annual field day.

*

The Care of the Feet.—Soldiers and all workers who are obliged to stand on their feet a great part or all of the working hours cannot take too good care of them. Women workers in particular are prone to complain of tired and aching feet.

It is well recognized from a medical point of view that the care of the feet is a prime essential to a soldier's efficiency. The matter is discussed in the *Spectator* of February 27 last by a gentleman who speaks on the strength of some thirty years of mountain walking and climbing, and who writes under the initials of "W. L." His experience was gained, so he says, under Swiss guides, who served as soldiers once a year. The practice of soaping the feet and socks he condemns. It does not offer much protection to the skin, while its alkali acts as an irritant. As a preliminary treatment, he advocates rubbing the feet with coarse, cheap Schnapps, or methylated spirit, as the skin is hardened thereby. The feet must then be greased before the socks are drawn on; and more grease may be plastered over the sock so liberally that it is felt to reach the skin at any specially sensitive place, such as the heel. "I have often entirely checked incipient abrasion," he says, "by taking off my boot and applying

grease liberally over the suspected spot. The grease used must be saltless and hard when cold. Lard or vaseline soon disappears. A week's supply of this hard grease may be kept in a tooth-powder box with a deep lid, in the pocket if the weather be cold, in the knapsack in warmer weather. I now use anhydrous lanoline, which is cheap and stiff. No doubt it could be combined with advantage with some fine, non-gritty boracic powder. But hard tallow does just as well, this becoming soft enough for application when the box is kept in an inner pocket. It is hardly worth while speaking of the use of the filmy 'sweat-absorbing' socks (price 1½d. a pair) used in Germany and Austria, for they could not well be obtained now. 'Spirits and pure hard grease,' and on no account soap, that is the secret that I learned as far back as the 'eighties.'—W. L." This eminently practical experience deserves to be widely diffused among our military surgeons.—*Medical Press.*

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The "Safety-First" Movement.—*American Medicine* reports that a comprehensive report is being prepared by the Goodyear Tire and Rubber Company of Akron, Ohio, to show the result of the first year of the "Safety-First" movement in the company's factory. The article states:

"Goodyear has had for several years a safety engineer, whose business it is to install safeguards for machines and make safe places found to be dangerous. It is interesting to note that when the safety movement was first begun Goodyear factory employees were skeptical and some of them regarded the whole proposition as a joke. But, so greatly have factory accidents been cut down in number that the skepticism is all gone and nearly all of the 7,500 workmen are aiding the movement heartily. They are helped in this by a series of suggestion boxes, in which employees are requested to drop written recommendations, etc., the valuable ideas being rewarded accordingly.

"Owing to the general interest in factory safety movements, it may be interesting to note how the Goodyear organization operates. First there is a central committee, with the assistant to factory manager as chairman, and a membership of nine men from various parts of the plant who have opportunities for getting about. They report regularly on dangerous conditions found, and each central committeeman is chairman of a division inspection committee, so the work is very thorough. One result is that only four out of the 307 men on the committees have been victims of injury, serious or otherwise.

"A new development of Goodyear welfare work is a school for foremen—two lessons a week for six months on Organization and Management. Other movements firmly established at Goodyear are lunch room, factory newspaper, library, labor department, hospital and police department, and fine results from all these movements for improving working conditions are reported on all sides."

Personal Notes.

The following were elected to membership in the American Public Health Association on August 13, 1915:

Thomas Verner Moore, M. D. Health Officer, Butte, Mont.

Irving Moehstadter, New York City. Bacteriological chemist.

Harry L. Roscoe, Kansas City, Mo. Dairy chemist.

Richard Stevens, Hoboken, N. J.

Frederick Almy, Buffalo, N. Y.

Miss Ellen W. Coolidge, Boston, Mass.

Hugo Jone, Brooklyn, N. Y. Food chemist and bacteriologist.

Garret Smith, Rochester, N. Y. Secretary, Rochester Public Health Association.

Dwight Irving Cooke, Chicago, Ill. Ventilating engineer.

James Austin Ellison, Wilmington, Del. Secretary, Board of Health.

Miss Annie B. Jennings, New York City.

Frank Clifton Tolles, Mt. Vernon, N. Y. Sanitary engineer.

Frederick W. Whitin, New York City.

Bleeker Van Wagenen, New York City.

Martin John Prucha, Assistant Professor, University of Illinois.

George A. Hastings, New York City. Sec-

retary, Committee on Mental Hygiene, State Charities Aid Association.

Wm. G. Kirschbaum. Health Officer, New Bedford, Mass.

Dr. Chas. G. Trembly. Health Officer, Saranac Lake, N. Y.

The following were elected to membership in the American Public Health Association on August 16, 1915:

Mrs. Philip North Moore, St. Louis, Mo.

William Shindel Bailey, Jamestown, N. Y. Editor, *The Nurse.*

Dr. Robert Law, Ottawa, Ont.

Dr. Otto Robert Eichel, State Health Department, Albany, N. Y.

Mantilla J. Fernando, City Engineer, San Juan, Porto Rico.

Dr. William Henry Rand, Washington, D. C.

Liston Paine, Victor, Mont. U. S. Public Health Service.

Michael M. Davis, Jr., Boston, Mass. Director, Boston Dispensary.

Miss Gertrude Seymour, New York, N. Y. Assistant editor, Health Department, *The Survey.*

Edgar B. Carter, Bacteriologist, Dallas, Tex.

Dr. I. Warner Knight, Somerton, Pa.

Wm. F. Cochran, Westbrook, Md.

Henry M. Lancaster, Toronto, Ont. Provincial chemist.

Dr. Samuel L. Jepson, Charleston, W. Va. State Commissioner of Health.

Dr. John L. Pomeroy, Los Angeles, Cal. City Health Officer.

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AMERICAN ACHIEVEMENTS AND AMERICAN FAILURES IN PUBLIC HEALTH WORK.

W. T. Sedgwick, Ph. D., Sc. D.,
Professor of Biology and Public Health, Massachusetts Institute of Technology; Member, Public Health Council, Massachusetts State Department of Health; etc.

Address of the President, American Public Health Association, Rochester, N. Y., September 7, 1915.

PUBLIC health work in America began early in the eighteenth century, with the introduction into New England of Oriental inoculation for smallpox by Boylston, and has achieved world-wide renown with the scientific sanitation of the tropical Isthmus of Panama early in the twentieth by Gorgas. The educating, organizing and equipping with sanitary machinery of a swiftly growing population—at first, sparse, but later sometimes intensely congested, and always fluid and unstable under the pressure of migrations and immigrations such as the world has never seen—is in itself a great achievement. But when that population is, like ours, lodged in a new environment, subjected to an unfamiliar and changeable climate, at times like that of Naples and at other times like that of Labrador, public health work is doubly difficult.

Under leaders like Boylston and Waterhouse, Shattuck, Walcott and Billings, and Reed and Gorgas—to whom we may now proudly add the name of Strong—sanitary information has been gathered and spread abroad and applied; vital statistics have been collected and studied; sanitary libraries have been formed; boards of health have been organized and directed; and epidemiology and other branches of sanitary science have been enriched and extended.

Various arms of the federal government have contributed materially to these achievements, *e. g.*, the United States Public Health Service, the Department of Agriculture, the Medical Corps of the Navy and, especially, the Army Medical Corps, which through the splendid and scientific labors of Reed, Carroll and Gorgas has solved some of the deepest mysteries, and overcome the worst difficulties, of tropical sanitation. Drs. Blue and White and their associates of the United States Public Health Service have also earned the honor and the gratitude of mankind by

their proof that, under proper administrative measures, the bubonic plague of the Orient and the yellow fever of the Occident may alike be held in check, while, as we are meeting today, Strong, in Serbia and Montenegro, formerly a government official but now representing various more private foundations, is winning fresh laurels for American public health measures. Thus the bold and brilliant epidemiological work of Boylston and Waterhouse, marking the beginning of experimental preventive medicine in the late eighteenth and early nineteenth centuries, has been continued and extended in the late nineteenth and early twentieth by their more scientific successors. Some of our state and city boards of health and some of our private institutions and laboratories have likewise lent invaluable assistance, as, for example, the Massachusetts State Board of Health, the New York City Board, the Rockefeller Institute and many others. Meantime, less original but not less enthusiastic and faithful work has been done by various associations for the promotion of the public health, such as the American Public Health Association, numerous anti-tuberculosis societies, organizations for the promotion of school hygiene, for the prevention of infant mortality, and the like. And now, happily, we have also at last, in addition to a number of creditable state, town and city boards of health, what is virtually a National Board of Health, namely the United States Public Health Service—a highly efficient arm of the Federal government.

Up to 1886, *preventive medicine*, chiefly in the form of vaccination, was the principal weapon for the promotion of the public health, but a long step forward was taken when, in that year with a reorganization of the State Board of Health of Massachusetts, sanitary engineering became a recognized and indispensable branch of public health science and public health service. Since that time *preventive sanitation*, and particularly the sanitation of towns and cities in respect to water supplies, milk supplies, ice supplies, sewerage, garbage disposal, street cleaning, the heating and ventilating of public buildings, the smoke nuisance, and other environmental factors of public health or ill-health, has come to receive close attention and treatment.

In the further development of preventive medicine and preventive sanitation, bacteriological laboratories for the quick detection of dangerous infections have since been installed almost everywhere, at least in the more progressive American cities and towns. We have begun the medical and sanitary supervision of schools and school buildings. We have invented, and put within the reach of all but the very poor, the most complete, convenient and salubrious heating and ventilating appliances in the world, for houses, theatres, halls, hotels and workshops. We have made ice, once a luxury for kings and emperors, a universal solace for all classes in hot weather. We have perfected and extended the preservation of foods by cold and by canning, so that seasonal scarcity is almost unknown.

We have invented and cheapened rubber clothing and especially rubber overshoes as a defense against our almost tropical rains. We have applied machinery to the manufacture of abundant and better and cheaper shoes and clothing. We have shown by experiment with a national spitting nuisance, the possibility of modifying unsanitary habits by education and reasonable sanitary ordinances.

But yet,—on the other hand,—we have thus far failed to achieve many much needed sanitary improvements. Our water supplies are to a great extent either in good condition or on the way to improvement, but our sewage disposal systems are still in many cases far from satisfactory. In this respect the parallel between the individual and the community is close, for while many intelligent persons attend carefully to the water they drink, most are negligent of their excretions, regarding as unimportant that regular and sanitary removal of wastes which is quite as necessary as the intake of wholesome food and drink.

Probably the most flagrant failure in American sanitation today is the almost universal lack of public convenience or comfort stations in American cities and towns. The stranger within the gates of most American cities seeks in vain for any public sanitary conveniences, being referred, if he is well dressed, to hotels or other semi-public buildings or, if he is poorly dressed, to saloons or railway stations, or other semi-private or public-service places. Some three months ago the leading newspaper of one of the proudest and most progressive cities of New England, which has since rejoiced to find itself "in the hundred thousand class," announced that its "first public sanitary . . . was opened Saturday morning, and will be open daily hereafter from 6 a. m. until midnight. The opening . . . marked the end of ten years of effort to get such a comfort station built." Failure like this to provide proper public toilet facilities in our towns and cities is to fail in one of the very elements of sound public health service.

We have also failed to reduce, as we should have done, typhoid fever in America. Of late much progress has been made in the right direction, but we need to remember that "it is the last step that arrives," and we have hitherto failed to attend closely enough to the single as well as to the seemingly final case. Like Nature, we are often "so careless of the single life, so careful of the race."

We have failed likewise to reduce as far as we should have done American infant mortality. Here undoubtedly our hot weather works against us, but so also does our milk supply, which can be and ought to be rendered safe by pasteurizing, and our parental ignorance and incompetence, which can be and should be lessened by education and the aid of public health nurses. We have as yet, and in spite of ample knowledge, failed to make our American milk supplies what they should be. This is partly because we have been too timid to insist that good milk not only costs more to make but is worth more and must therefore be paid for, and

partly because we have not yet taught the public as we should that the only safe milk is cooked milk, and for infants, milk that is pasteurized—preferably in the final container. I have myself lived through the last year of the period—now happily remote—when no milk was pasteurized by anybody; through the next in which only pioneers like Nathan Straus preached or practised pasteurization, while many if not most, physicians, deprecated the practise; through the one following, in which the scales began to turn in favor of pasteurization; and into the present when almost no one fully informed on the subject actively opposes pasteurization. And yet, even today, some physicians are shortsighted enough to tolerate if not to recommend the general use of raw milk, which still constitutes the great bulk of the milk used by infants and adults all over the land. Such use of raw milk we must count as long as it lasts one of our worst public health failures.

We have also failed thus far to pay proper attention to our American climate, which has been well described by a popular writer as "polar-tropic." Placed as we of the United States are on the latitude of southern Europe, Persia, and the northern parts of Africa and Arabia, we are exposed alike to the stimulating and dangerous sunburn of the south and the cold dry winds driving down upon us from the continental area of Canada and the high north. In this fact, perhaps, we shall some day find one of the principal causes of that eager, strenuous, often nervous and sometimes excited, condition which we may call "American-itis."

With vast regions given over to rural life, and with other regions, called industrial, small in area but teeming with life and noise, we have as yet only touched the surface of the public health problems involved. The same is even more true of the problems of alcoholism and venereal disease. Here we may learn by comparison with the spitting evil that it is easier to overcome habit than to conquer appetite, and doubtless we must be prepared for further disappointments, yet forever keep on trying.

Some streets of most American cities are disgracefully dirty and untidy. Dust, horse dung and other dirt, papers, fruit skins, old hats, abandoned umbrellas, discarded shoes and the like, are often seen lying about our streets. Yet these same streets are the principal playgrounds of the poor and ought for every reason to be kept scrupulously clean. We have devised excellent apparatus for heating and ventilating halls and houses in our polar winters but have neglected the almost equally important problem of cooling habitations and public buildings in our tropical summers. Our vital statistics are not yet adequate; our health boards are too often loaded up with political refugees, political doctors, and ignorant or incompetent laymen. Our health officers are frequently untrained, ill paid and only part time employees of a no-time board and even the best and most faithful may suffer from insecure tenure of office.

Lastly, and above all, I must put our almost complete neglect of personal hygiene. From 1720 to 1886 we had little to show in public health work beyond vaccination for smallpox —the fundamental procedure of *preventive medicine.* To this, which has since expanded immensely in various directions, we have added *preventive sanitation,* by which I mean the purification of water and sewage and milk, the control of mosquitoes against malaria and yellow fever, improved housing and other fundamentals of a sanitary environment. But we have not yet even begun to demand that study and care of the individual which is still more fundamental. We have as yet paid little or no attention to over-eating, overworking, over-drinking, deficient exercise, deficient sleeping, family hygiene, and the hygiene of special organs, such as eyes, ears, bowels, nose and feet, all of which I propose to group together under the term *preventive hygiene.* We have achieved much in preventive medicine and preventive sanitation, but we have as yet failed for the most part in preventive hygiene, which is perhaps the most important of all. Here, therefore, we may reasonably expect the greatest progress in the nearest future. Rightly studied, preventive hygiene will include personal, domestic, family and social hygiene. It will deal with celibacy and marriage, with housekeeping, with the high cost of living, with food economy, with domestic service, with child hygiene, and with the right conduct of mature and elderly life, as well as with personal hygiene. It will in the future play, perhaps, the principal part in solving many of the problems of American life, health, prosperity and happiness. Our teaching of physiology, both on the higher levels and the lower, has never emphasized as much as it should have done its practical hygienic applications to the conduct of life. In fact, our whole teaching of hygiene and sanitation has been grossly neglected. Even the best medical schools have paid but scant attention to these subjects, while the instruction given in our public schools has generally suffered from half-informed teachers and uninformed school committees. The best teaching of today is to be found, not in the text-books or the schools, but in the leaflets and booklets of certain boards of health and life insurance companies. This, surely, is a scholastic reproach which must not be allowed to stand.

In view of the high opinion which he is known to hold touching the promise and the potency of public health work, and especially of preventive medicine, I invited President Eliot, our most expert as well as our most distinguished American educator, to attend this meeting or, if he could not do so, to send us a message. His reply follows:

"I regret very much that my engagements will not permit me to attend the Health Congress to be held in Rochester, N. Y., on September 6–10. The subjects to be discussed at that Congress are of the utmost importance for all the American peoples; and, indeed, it has seemed to me for some time past that preventive medicine is showing us all the right way to deal

with all the evils which beset civilization. You and I remember very well when the total effort of the medical profession was directed to healing or curing people already suffering from disease. Boards of health in like manner tried to remedy evils already developed; they did away with cesspools, substituted pure water supplies for foul, and clean slaughter houses for dirty. The attention of the medical profession and of sanitary officers is given nowadays to the prevention of evil; and this is far the most effective way to conserve human life and energy.

"I believe that this method of preventive medicine is the one which should be universally applied for the defense of society against the evils which afflict it—such, for example, as alcoholism, prostitution and war. All the beneficent forces of society should combine to *prevent* these terrible evils. Medical research and preventive medicine are teaching the civilized world how to deal effectively with moral, as well as physical, diseases.

"Sincerely yours,

"Charles W. Eliot."

In conclusion, I desire to express my humble appreciation of the honor conferred upon me by your gift of the high office which I hold. The American Public Health Association is today a splendid force in the land. Its Journal, under the able editorship of Professor Gunn, our devoted and energetic secretary, is worthy of the great body which it represents. It is your duty and mine to strengthen his hands, to increase our membership and to help on the good work. If the Association continues to grow in numbers and in influence along the broad path thus far pursued, remaining democratic rather than bureaucratic, it will long be worthy of the great name —"American"—which it so honorably bears. Two of our component countries, the Dominion of Canada and the Republic of Mexico, are bearing the heavy burdens of war, the one foreign, the other civil. Both have the liveliest sympathy of their confrères in this Association. It may seem to some as if, under the shadow of a war characterized as never before by the destruction of life, efforts for saving life, through hygiene and sanitation, must be of small moment. But it is not so. After the clouds—the sun. And we believe that after the present bloody conflicts are ended—and may that time quickly come—the races of mankind will turn as never before to the nobler pursuits of Life, Liberty, Health and Happiness. When that time comes, the eternal principles underlying these things will once more move and inspire the nations as sunshine warms and quickens the earth after a storm. Meantime, we must prepare for active and intelligent dealing with the thousand new and mighty problems which these wars are certain to bring before us and to this task we turn with cheerful courage.

THE PUBLIC HEALTH.

HONORABLE CHARLES S. WHITMAN,
Governor of the State of New York.

Address of Welcome to the American Public Health Association at the Annual Conference of the Sanitary Officers of New York State and the New York State Sanitary Officers' Association, Rochester, September 7, 1915.

I FEEL it a privilege and a pleasure to welcome on behalf of the Empire State the various organizations which are meeting in Rochester this week for the purpose of discussing the problem of the public health.

At the present stage of social development it seems essential that a nation should be prepared for defense against the attacks of human foes. It is quite as essential that it be efficiently organized for the campaign against those invisible foes which in the long run work a more terrible havoc than even war can boast. The American Public Health Association, representing as it does the best in public health science which the whole North American continent can offer—bearing on its program the insignia of the Dominion of Canada and the Republics of Mexico and Cuba, as well as of the United States—is a splendid example of a truly international army engaged in the noblest of all wars—the War against Disease.

I am glad, too, to welcome to this platform the president of the American Public Health Association, Prof. W. T. Sedgwick, not only as the presiding officer of the body which he so honorably represents, but as a citizen of the United States whose unique services as investigator, and teacher in his own laboratory, and as a preacher of the gospel of public health throughout the country entitle him to the gratitude of all. I am informed that of the seven Directors of Divisions in the New York State Department of Health, three are "Sedgwick's boys" which may be taken as some measure of the extent to which his influence prevails in the field of public work.

It is a fortunate thing that it has been found possible to call the Sanitary Officers of the State of New York to meet for their Fifteenth Annual Conference at the same time and place with the American Public Health Association. The health officers of the cities and villages and towns of New York will profit by contact with the leaders in public health science represented in your organization; and we trust that you may find something of interest in the methods of health administration characteristic of the Empire State. Professor Sedgwick's position as a pioneer on the academic side of public health science is matched by what Doctor Biggs has done on its practical executive side; and the results obtained under his twenty years of leadership by the New York City Department is perhaps the best example you have of the definite results in life-saving which may be attained by a scientifically and aggressively conducted public health campaign.

Finally, I am glad that these aus-

picious meetings are to take place in Rochester; because Rochester is well known to all New Yorkers, and probably to health workers as well, for the efficient health administration of Health Officer Goler and for the splendid public service rendered by the Rochester Public Health Association under the leadership of Doctor Leary.

I have said that I hoped we could show you some few things of interest, in part return for the manifold benefits we shall receive from your deliberations. In particular, I would commend to your consideration our plan of state sanitary administration, of which we are particularly proud and which a number of other states—Massachusetts and New Jersey being the latest examples—have more or less closely followed in reframing their own public health laws.

The first important principle embodied in the New York Health Law is the delegation to a Public Health Council, composed of the Commissioner of Health and six appointive members, of the power to establish qualifications for directors of divisions, sanitary supervisors, local health officers and public health nurses, and to establish sanitary regulations dealing with "any matters affecting the security of life and health, or the preservation and improvement of public health in the State of New York" outside of the city of New York.

This delegation to a small expert body of the power to formulate a sanitary code is essential to sound sanitary progress. The requirements of modern sanitary health regulations are so complex and must be subject to such constant modification that a code enacted by a legislative body must necessarily be either unduly repressive or so vague as to be of little practical value. It is undoubtedly a matter of serious moment to confer such powers upon a small body, but with the proper personnel this method furnishes the only satisfactory method of working out the problem. We are fortunate in having such men as Dr. Simon Flexner, Dr. T. Mitchell Prudden, Prof. H. N. Ogden, Mr. Homer Folks, and Dr. Wilhelm Gaertner, and such a woman as Mrs. Elmer Blair upon our Council. The American Journal of Public Health, the official organ of your Association, in its issue for last October, said of the first sections of the Code promulgated by the Public Health Council: "This really notable sanitary document embodies the most recent advances of public health science more completely than any similar set of regulations with which we are acquainted, and offers convincing evidence of the wisdom of delegating powers of this sort to a small and expert body."

While the Council is thus given what amounts practically to a delegated legislative authority within its special field, it has wisely been given no executive functions. Concentration of responsibility is essential to administrative success, and the State Commissioner of Health is solely responsible for all the executive policies of his Department.

The most effective health work in any community can always be carried on by someone on the spot, who knows

the local situation and is a part of the community which he is serving. A serious difficulty, however, arises in regard to the prosecution of such work in small communities, because the adequate technical knowledge is usually not available. The New York law meets this difficulty by a very successful expedient through the creation of a group of twenty district sanitary supervisors who act as intermediaries between the State Department and the local health officer, bringing to the latter the technical knowledge and the moral support of the state organization.

These sanitary supervisors, appointed under the provisions of the Civil Service Law, have rendered invaluable service during the past year, and I regard them as forming one of the most essential elements of an efficient state health organization.

Responsible public officers are today confronted with serious and difficult problems in regard to the desirable expansion of public activities along what may be roughly designated as social service lines. Public health is only one of many fields of public work which are growing and expanding year by year, and demanding constantly larger appropriations which they are able to justify by valid evidence of excellent results attained. Meanwhile city and state debts and tax rates are mounting to an unprecedented degree. Some of the money needed for such beneficent work may be obtained by the elimination of waste in the conduct of the government such as we have been able to accomplish along many lines in New York State during the past year. Somewhere, however, there must come a stopping place. We must recognize that there are things which are good to do for humanity's sake—things which would bring in large return through the saving of economic waste —and yet that we cannot undertake to do these things because we cannot afford it. When that time comes, however, public health is one of the social activities of the state whose development should be curtailed only in the very last necessity. The work which your Association is doing throughout the North American continent is one of the noblest works which can enlist the energies of man; and permit me to say that here in New York State we fully appreciate its unique importance and its limitless possibilities.

There were over 140,000 deaths in New York State during the year 1914 and, if the estimates of the Committee of 100 on the Conservation of Human Vitality are to be relied upon, 40 per cent. of this mortality might have been prevented. Think of it—over 50,000 lives needlessly lost in one state during a single year.

Over 23,000 of these 140,000 deaths occurred among infants under one year of age; and this fraction of the death-rate is that which appeals most strongly to our sympathies, while it offers the most brilliant opportunities of service to the public health worker.

New York has devoted special attention to this problem and with most gratifying results. In 1913 the infant mortality rate for the state was 109 deaths under one year for every 1,000 births. The State Department of

Health in 1914 and during the present year has bent every effort toward reducing this figure. Exhibits were prepared dealing with infant welfare and were sent out throughout the state. The energies of the Department were particularly directed toward the establishment in every municipality of Infant Welfare Stations, which have everywhere proved such effective agents in reducing the waste of infant life. This campaign has recently been supplemented by the organization of a concerted campaign for Little Mothers' Leagues throughout the schools. The result has been that the infant mortality rate of the state for 1914 fell to 101, and 1915 has so far shown a better record even than 1914. This reduction in the infant mortality rate from 109 to 101 corresponds to a saving of nearly 2,000 infant lives which in itself is a splendid return on the total cost of maintaining our state and local departments of health.

The acute communicable diseases, such as typhoid fever, diphtheria, scarlet fever and the like, are passing year by year more completely within our control. Typhoid fever killed 1,368 persons in New York State in 1908 against only 867 in 1914; while the number of deaths from scarlet fever has fallen in the same period from 1,667 to 682. Diphtheria remains by far the most important of this group of the acute contagious diseases; and if, as I am assured, the 2,000 annual deaths from this disease in New York State are due largely to delay or neglect in applying a simple and efficient remedy in the form of diphtheria antitoxin—there is surely a grave responsibility resting upon the practicing physician to remedy this deplorable condition of affairs.

Tuberculosis remains the most difficult and important single problem which confronts you in your work. The death-rate from this disease has fallen greatly during the past twenty years, but the rate of reduction has been very slow of late, and even last year this one disease cost New York State 16,000 lives. We have, as I believe, very wisely adopted the plan of providing for the care of this disease by counties, and 31 out of 57 counties in the state now have county hospitals either in operation or definitely provided for. One of the greatest needs of the moment, as I am informed, is for public health nurses to work in the various communities, to discover cases of the disease in their earlier and more easily curable stages, and to assist patients who must remain at home to maintain so far as possible conditions which ensure their own recovery and protect their families from infection.

As a man who has recently passed the danger line of 45 years, I am beginning to feel a keen personal interest in the campaign which public health officials are waging against the degenerative diseases of adult life. It is certainly a disconcerting thing that, while you are gaining ground, if only trench by trench, at all other points on the battle line, the death-rate at ages over 45 should show unmistakable signs of actually increasing. I have good hope, however, now that the problem is clearly recognized, that your efforts to induce the public to

observe the rules of personal hygiene and to undergo a periodic medical examination for the detection of these diseases at a curable stage will bear fruit in the near future. I can assure Commissioner Biggs that I shall personally make every effort to follow the rules of moderation in all things which he lays down in the exhibit of the Hygiene of Adult Life which all of us over 45 have been studying this afternoon.

Seriously, I wish it were possible to make the public realize as you and I realize how much this campaign against preventable disease really signifies. The death-rate in New York State was 15.0 per 1,000 in 1913 and 14.6 per 1,000 in 1914. The figures are so close together that they seem wholly insignificant to the casual observer. What does four-tenths of a point in the death-rate mean to the average citizen? It meant all the difference between life and death for 4,000 men, women and children in New York State last year; for this reduction in the death-rate corresponds to a saving of 4,000 lives. Taking the ordinary estimate of $5,000 for the average value of a human life, this means an economic saving of $20,000,000 due to progressive health work in a single year.

The higher ethical standards and the broad humanitarianism which have developed among large masses of the people in these recent years imperatively demand that the health and social service activities of the government shall be absolutely divorced from politics. Such has been the record in my judgment of the administration of the State Department of Health since its reorganization under the revised Public Health Law, and such will be the future course of all such activities in the state government during the remainder of my administration as Governor.

I greatly regret that the legislature at its last session did not make appropriations adequate to fully maintain the work of certain divisions of the State Department of Health—and especially the Division of Sanitary Supervisors, whose work has proved most important and beneficial to the local communities, and by means of whom the knowledge and skill of the expert Sanitarians of the Department of Health are placed at the disposal of the health officers of even the most remote rural districts. I sincerely hope that some means may be found by which the services of these physicians may be retained, and feel confident that next year, when the members of the legislature are made fully acquainted with the facts as to the value of these services, funds will be provided for their continuance. I shall use my influence to attain this end, for while rigid economy in the administration of the finances of the state is essential, savings in expenditure attained through decreased efficiency in health work are not only unwise but resolve themselves in the end into irreparable waste of the most valuable resources of the Commonwealth. As compared with the first seven months of 1913, I am informed that the infant death-rate for 1915, outside of New York City, has been reduced from 127 to 97 per thousand births, or 30 points. This is a very remarkable achievement in two years and work which produces such

results must not be interrupted. If this rate is maintained for the remainder of the year it will mean a saving of more than 2,500 infant lives.

The promise of the Commissioner of Health made at the beginning of this year to save 25,000 lives in the state in five years seems almost certain of realization, if only the necessary support is accorded to the Department in its work.

We are confident that this pledge will be more than redeemed. To the attainment of this splendid goal I pledge my cordial and hearty support so long as I am Governor. I trust that New York may not only wage a successful war against preventable disease within her own borders, but that her example may be of assistance to you who are fighting the same battles through the length and breadth of the North American continent.

The crowning glory of this twentieth century is to be found not in the great industrial progress and commercial development—not in the marvelous scientific discoveries—not in the incredible expansion and efficiency of its military organization, but in the improvement in the social condition of the masses, and in the higher standards of living, rendered possible to a large extent because the losses from sickness and death have been so enormously reduced by the extraordinary developments in preventive medicine, and sanitary science. To Pasteur and Lister, and Koch, and Behring and Ehrlich in Europe, and to Reed and Flexner and Theobald Smith, and General Gorgas (who is with us tonight) in this country, to them and their associate workers in scientific medicine is the greater honor due.

DEVELOPMENT OF AMERICAN PUBLIC HEALTH ENDEAVOR.

STEPHEN SMITH, A. M., M. D., LL.D.
of New York,
Founder and First President of the American Public Health Association.

Read before the General Session of the American Public Health Association, Rochester, N. Y., September 8, 1915.

Mr. President and Members of the Association:

LOOKING backward half a century and tracing the logical course of events, scientific sanitation of communities as a preventive of epidemic pestilences had its origin in England as the result of a very simple incident in 1849.

Cholera was approaching England for the first time since its appalling decimation of cities and villages in 1832. Public alarm became so intense that the clergy was moved to resort to the old method of arresting the progress of epidemics and thus allaying the apprehensions of the people by the appointment of a day of National humiliation and prayer. A large and influential committee of clergymen was selected to visit the Prime Minister and request him to issue the usual proclamation. His reply was to this effect:—"Go back to your homes and make them and their surroundings clean and keep them clean, then ask the Almighty to bless your efforts at protection against the pestilence."

The clergymen and religious classes of England were shocked at his irreverence and astonished at his reliance on such a trivial measure for protection from a pestilence sent by God as a punishment of the sins of the people. The day of fasting and prayer was accordingly held, under the sanction of the Church, throughout England.

The cholera came and wrought its usual havoc in the cities and villages of the country, being stayed in its progress by neither the prayers of the clergy, nor the fumes of sulphur burned in the houses and streets, the most potent preventive agent against the spread of pestilences then known. The Prime Minister's advice was not only not followed, but was the subject of universal ridicule.

At length the cholera disappeared as it came of its apparent own free will. The Registrar General then proceeded to "take stock" of the results of the visitation and found that the toll was very heavy, not only in the reduction of the population, but in the amount of sickness, misery and domestic waste that followed in its trail. But one bright spot illumined the dark picture which he drew of the results of the epidemic. A small interior town reported that not a single case of cholera had occurred among its people though it visited all of the neighboring villages with great mortality of the people. On inquiry as to the reason that this little hamlet was passed over by the pestilence it was learned that the authorities had taken the Prime Minister's advice to the Committee seriously and had not only thoroughly cleaned

the homes, the streets and all waste places, but had appointed a "Vigilance Committee" with full power to enforce cleanliness. It farther appeared that not only was the town saved from cholera by this simple and rational means but there was a great diminution of all forms of disease. This incident made sanitation a science in England. It became the popular political demand of candidates for office and one very prominent politician was so annoyed by questions as to his views of certain current sanitary questions that he cried out, "Sanitas sanitatum omnis sanitas." The Premier's words were "Apples of gold in pictures of silver."

In 1863–4 the initial incident occurred in New York City which gave the vital impulse to sanitary reform in this country. An epidemic of typhus fever was raging, causing widespread alarm. While in charge of a typhus fever hospital my attention was called to the large number of cases that came from a single house. For the purpose of determining the conditions under which the people lived I visited it and found it a typical fever nest—a filthy, deserted building, the resort of immigrant families. The attempt to clean or close this house disclosed the fact that there was neither law, ordinance, or force, of any legal form, adequate to effect that object.

These facts becoming public excited an interest amounting to indignation and led to a "Citizens Association" undertaking to secure adequate health laws. The final outcome of the agitation was the enactment of the Metropolitan Health Law, in 1866. This law was drafted by Hon. Dorman B. Eaton and myself after an examination of existing health laws. By its perfection in details and especially by the extreme power which it gave health authorities in the performance of their duties, it was revolutionary.

We incorporated in the Metropolitan Law a new feature which created an epoch in the administration of sanitary laws and ordinances. Hitherto, health authorities, like other public officials, were liable to be restrained in the performance of their duties by the courts and thus it became difficult often to remove nuisances dangerous to life and detrimental to health. It seemed to us that simple common sense dictated a provision of the law that when the health authorities officially declared any matter or thing dangerous to life and detrimental to health nothing should interfere with the Board's order of abatement. Accordingly a clause of the law was drafted forbidding any court proceedings delaying or obstructing its abatement of nuisances.

Practically it was an anomaly in municipal government, as it created a Commission with power to make and execute its own laws and sit in judgment on its own acts. It was a veritable "Imperium in Imperio." Its constitutionality was tested in the courts but it was sustained and for half a century it has given to New York its most popular and useful department of government. So apprehensive was the legislature that it would prove expensive that its expenditures were restricted to $50,000 annually. Now it is freely accorded $4,000,000.

And the city has been richly rewarded for its expenditure. The mor-

tality of its people has been reduced from 38 in the 1,000 to 12 in the 1,000, which means that 26 persons in every 1,000 are now annually saved who would have died in New York City if the conditions fatal to life were the same as half a century ago. These figures carried to a logical conclusion give the following almost incredible results, viz., if, in every 1,000 population, 26 are saved, in 100,000 population, 2,600 are saved, and in 1,000,000 population, 26,000 are saved and in a population of 5,000,000 the present population of the city, 130,000 are annually saved who would have perished if the conditions affecting the public health were the same as in 1866, the date of the enactment of the Metropolitan Health Law.

It is true that many public improvements have contributed to these extraordinary results, but even these were for the most part the outcome of the agitation for city cleanliness.

The American Public Health Association had its inception in the Metropolitan Board of Health. During the three years' struggle to secure the law under which it was organized, a widespread interest was created in the general subject of civic sanitation. This was greatly intensified by the success of the Metropolitan Board in its complete control of an epidemic of cholera which attacked the city immediately after the organization of the Board. Efforts were made in different cities to organize health departments but there was that lack of cordial public support essential to success. It was evident that the most pressing need of these efforts, to give permanent success, was the creation of a dominant public sentiment like that of England which would not only sustain, but would demand sanitary reform of public officials.

As a Commissioner of the Metropolitan Board I had a large correspondence with those interested in promoting sanitary organizations, and in conference it was determined to undertake a campaign of education through the medium of a nation-wide association, whose annual meetings in different parts of the country and whose publications would tend to awaken and maintain the active and permanent interest of the people in sanitary administration. The organization of this Association at Atlantic City followed.

Nearly half a century has elapsed. Has the Association fulfilled its high mission as expressed in its Constitution, "The advancement of sanitary science, and the promotion of organizations and measures for the practical application of public hygiene."? To effect "The promotion of organizations and measures for the practical application of public hygiene," one of the earliest acts of the Association was to instruct the Secretary "To open correspondence with local health authorities of all parts of the United States, requesting information upon matters relating to the health of their respective localities, and offering to reply to any inquiries on similar subjects which may be made by them."

This correspondence led to the diffusion of a vast amount of information on questions relating to the necessary provisions of sanitary laws, the plan of a well organized board of

health, the methods of sanitation of cities, the use of disinfectants. These were new subjects with which few were familiar and yet they embodied the basic principles of the practical application of public hygiene. Boards of health increased rapidly and each was organized with adequate powers and equipment.

The annual meetings were planned with a view to the greatest possible effect on the people of the locality. To this end the sessions during the day were devoted to the reading and discussion of papers, and the meetings of the evening to the addresses of popular speakers. Personal observation of these meetings convinced me of their great importance in awakening an interest in sanitation of a class of people who could not otherwise be interested. The membership of the Association was also greatly increased. The first meeting in Cincinnati, the second in New York and the third in Philadelphia were notable for the public interest excited locally and throughout the entire country by the wide publication of its proceedings.

During the past few years there have been strenuous but unsuccessful efforts made by a Committee of One Hundred eminent citizens to secure the creation by Congress of a National Department of Health with a Cabinet Secretary at its head. It is an interesting fact that this Association, at its preliminary meeting at Atlantic City, took cognizance of the need of a national health authority, and that subsequently it appointed a committee empowered to take such action as was deemed necessary to effect that object. For a time the committee failed to accomplish anything, but taking advantage of the great epidemic of yellow fever of 1878-9 it secured the necessary legislation and the establishment of a National Board of Health. Unfortunately the law contained a clause limiting its existence to four years and at the end of that period it lapsed. It had done valuable work, especially in its investigations of the yellow fever epidemic and of an outbreak of cholera. Meantime its appropriations were transferred to the Marine Hospital Service on which Congress conferred, from time to time, public health duties of such a distinctive character as to entitle it to be known as the Public Health Service.

In these now historical events we have an explanation of the failure of the Committee of One Hundred to establish by act of Congress a fully organized Department of Health. A generation earlier we learned that Congress is averse to creating a new Department in the Government, but it will increase the duties and powers of subordinate branches of the public service, and if that service is so conducted as to establish a manifest necessity of its being elevated to the position of an independent Department of the general Government with a Cabinet officer at its head, Congress readily yields and enacts the necessary laws. In this manner existing Departments, like that of Agriculture, have been established.

Impressed by these facts in our early experience I suggested, at the Buffalo meeting, that the Association take such action as will secure from Congress the legislation necessary to

make "The Public Health Service" "The Department of Health" of the government. It must be evident to every one familiar with the operations of that Service during the last decade that it has gradually assumed a position that requires little more than an adjustment to its new relations to other Departments of Government and a broadening of its powers, duties and equipment, to make it a most complete Department of Public Health. Its altogether admirable methods of research, its successful efforts to control and exterminate the bubonic plague, its judicious coöperation with municipal and state health authorities and its world-wide watchfulness of the movements of contagious diseases as they affect emigrants to this country, entitle it to the confidence and support of Congress. I can conceive no greater public service that the Association can render the country than the installation, through the medium of necessary legislation, of the United States Public Health Service as the Department of Public Health of the government and thus accomplish one of the first objects of the Association. And the time seems to be especially opportune for such an effort owing to the interest in the question, both in Congress and in the country, due to the widespread agitation of the subject by the Committee of One Hundred.

Mr. President:—I fear I have trespassed too long upon your time and patience with these crude reminiscences of the early days of the Association, but my deep and abiding interest in its success will, I trust, be a sufficient apology. I esteem it a remarkable privilege that I am permitted to attend this Forty-third anniversary meeting. With the exception of the distinguished Professor Emeritus of Chemistry of Columbia University of New York, Charles F. Chandler—like Job's messengers—I can say, "I only am escaped alone to tell thee" the events that led to, and attended, the organization of the Association.

I well remember the *personnel* of the small but enthusiastic gathering at Atlantic City on the 12th of September, 1872, forty-three years past. There were Bacon of New Haven; Harris, Chandler, Janes and Morris of New York; Hartshorne of Philadelphia; Cox of Washington; Rauch of Chicago; Clendenin of Cincinnati; Woodworth of the Marine Hospital Service—all but two silent now and forever more. But their works do follow them. In great feebleness, but with abiding faith, they planted the tree, now grown to such dimensions, whose leaves are "For the healing of the nations."

AN APPRECIATION OF HENRY LOMB.

Rev. Clarence A. Barbour,
President Rochester Theological Seminary.

An Address before an Open Meeting of the American Public Health Association, Rochester, N. Y., September 7, 1915.

THIS hall has seen many significant and memorable assemblages, but none more significant nor more memorable than that of June sixteenth, seven years ago. On that day the body of Henry Lomb lay here, amid such tributes of honor, respect and love as are granted to few among the sons of men. Over the hushed thousands within these walls and the many who could not gain admission, brooded the influence of an hour such as comes but rarely in the history of any community. By order of the city's chief executive, and in solemn recognition of the going of Rochester's great commoner, flags floated at half-mast, silent symbols of a city's grief. Three days before, among rich and poor, the exalted and the lowly, among his comrades in arms and his contemporaries in the city's life, among the captains of industry and the great body of industrial workers, among the teachers and children of the public and parochial schools, there was the one accent of sorrow as the news came that Henry Lomb was dead. He had no enemies; he had lived a friendly life; not a life of passive good will, of lethargic benevolence, but a life of that philanthropy which seeks opportunity for useful ministry, of that benevolence which studies the needs of humanity that it may spend itself in practical service. Never has there gone from this city into the silence beyond a more gentle and unselfish spirit, or one more widely and gratefully loved.

Well nigh the full fourscore years of life were granted him. The psalmist says of those attaining this age that their strength is but labor and sorrow. His years were years of labor, for he was no favored child of fortune. His splendid business success, with its resultant wealth, he earned, by ceaseless toil, from the humblest beginnings. Labor, indeed, characterized his life, but sorrow not wholly so. Doubtless he had his personal griefs. If he had them, he did not tell them. But to our certain knowledge there was much of joy in his life, for he knew that numberless homes and countless lives were brighter because of him, and this brings joy that the world cannot give and cannot take away.

The gathering of that day was cosmopolitan. There were his comrades in arms, survivors of the cruel days of war, chief among them the old Thirteenth, which had passed not unscathed through the fiercest battles. Henry Lomb was the captain of Company C in that regiment, winning his rank, as he won all else, by distinguished merit. There were men and women by the thousand, employees of the great business which he and his partner, John J. Bausch, happily still

among us, had made world-wide in name and fame. What careful consideration for their welfare did they remember of him! To him they were never "hands," they were living personalities, whose interests everywhere and always were his own. There were Sons of Veterans and Spanish War Veterans, men of a younger generation. His heart was ever kept in youth by friendly contact with young men. There were representatives of the institutions which the president of the University said in his address upon that occasion were his monuments—the Mechanics Institute and the Rochester Public Health Association. More than twenty years before he had assisted in the organization of the Mechanics Institute, and was chosen its first president. It is not too much to say that but for him the Institute which means so much in the life of the community would never have come to its high estate. There were city and county officials, to lay the crown of community honor at his feet. There were hundreds of girls from the eighth grades of the public and parochial schools, in recognition of his wise and gracious provision which year by year freely gave to the girls of that grade the opportunity of the course in cookery in the Mechanics Institute—one phase of his constant interest in the training of school children for useful living. It is well that the Board of Education has placed the name of Henry Lomb upon one of our public schools, a memorial of him for generations to come.

And now, in this annual gathering of the American Public Health Association, assembled in the same hall which held that gathering of seven years ago, I am asked to pay brief tribute to the memory of this man, whose name can never be forgotten in the history of this organization or in the record of the total work for the safeguarding and promotion of the public health. For years he was a regular attendant at the meetings of this Association, as well as one of its chief financial supporters, and he was constant in his endeavors to advance its interests, as well as those of public hygiene, through every educational and feasible means. His long-time friend, Doctor Bryce, chief medical officer of the Department of the Interior in the Dominion of Canada, informs me of a fact not generally remembered, that toward the end of his life, wishing to leave some permanent testimonial of his interest in public health, he gave the sum of $2,500 as a trust fund, to be devoted to the interests of the Association in whatever way it might deem wisest and best. This was the fund of which the Publication Committee of the JOURNAL of the Association made use to supply credit at the bank, and with that start the JOURNAL was made a success and became practically self-supporting.

Through Captain Lomb's munificence there came into being the so-called Lomb Prize Essays, which the American Public Health Association has distributed by the tens of thousands. Of them and of him the Association says: "That these essays may be placed in the hands of every family in the country is the earnest desire of the Association, as well as the heartfelt

wish of the public-spirited and philanthropic citizen whose unpretentious generosity and unselfish devotion to the interests of humanity have given them." The titles are significant of the direction in which the mind of Henry Lomb most easily and naturally worked. Each essay was written by a master in the field of which he wrote. These are the titles:

"Healthy Homes and Foods for the Working Classes."

"The Sanitary Conditions and Necessities of School-Houses and School Life."

"Disinfection and Individual Prophylaxis against Infectious Diseases."

"The Preventable Causes of Disease, Injury and Death in American Manufactories and Workshops, and the Best Means and Appliances for Preventing and Avoiding them."

"Practical Sanitary and Economic Cooking Adapted to Persons of Moderate and Small Means."

Of Captain Lomb's connection with the Rochester Public Health Association I can speak only a word, but that is one of warmest appreciation and gratitude. In his death the Association lost its founder and its best friend. Through him it was organized, on the eightieth birthday of Dr. E. M. Moore, another of Rochester's great citizens, and it was at his request that Doctor Moore was elected its first president. For ten years he maintained it almost alone, so far as ways and means were concerned, in the belief that the work ought to be done, and that in time the community would recognize the need and come to the support of the Association, as it has. His support of the Rochester Public Health Association, as all else to which he gave, was rendered in so modest and unassuming a way that the public at large had no opportunity to know the measure of his generosity. He always insisted that his name and personality should be kept in the background, his only desire being to serve his fellow men without thought of reputation or reward.

Henry Lomb has gone, but in his case the good is not "interred with his bones." "Republics are ungrateful," says one. Equally, I suppose, it would be said of communities and organizations. But they are not always ungrateful, certainly not to him of whom we think at this hour. Gentle, retiring, kindly, generous, self-effacing Henry Lomb! To some of us he was a friend and comrade, whose place can never be filled by another. It is well that those who did not know him shall be reminded that such a man has lived his life among us, and that much of what is seen today in the field of this Association's activity tells that his works do follow him. Some of his seed-sowing was in good and honest soil, and the harvest has been great, though its completeness is not yet.

Some people are greatly impressed by the multiplying power of evil and of wrong. They are fond of quoting:

> "This lie brought forth others,
> Dark sisters and brothers,
> And fathers and mothers—
> A horrible crew!"

That is too true, but we sometimes forget that the principle applies with equal

certainty to goodness and truth. The lines may be altered to read:

"This truth brought forth others,
Bright sisters and brothers,
And fathers and mothers—
A radiant host!"

That which Henry Van Dyke wrote of another may with equal truth be said of our friend whose memory we pause tonight to honor:

"Oh, quick to feel the lightest touch
Of beauty or of truth,
Rich in the thoughtfulness of age,
The hopefulness of youth,
The courage of the gentle heart,
The wisdom of the pure,
The strength of finely tempered souls
To labor and endure!

You followed, through the quest of life,
The light that shines above
The tumult and the toil of men,
And shows us what to love,
Right loyal to the best you knew,
Reality or dream,
You ran the race, you fought the fight,
A follower of the Gleam.

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Now well you fare, in God's good care,
Somewhere within the blue,
And know, today, your dearest dreams
Are true,—and true,—and true!"

THE RESPONSIBILITY OF THE CITY IN THE TUBERCULOSIS MOVEMENT.

THEODORE B. SACHS, M. D.,
Chicago.

Read at the Eleventh Annual Meeting of the National Association for the Study and Prevention of Tuberculosis.

IN A systematic effort toward gradual elimination of sources of tuberculous infection, a municipality is confronted with a number of factors, geographically or legally outside of the domain of municipal control. The very sphere of municipal control is dependent upon state legislation; the control of some factors lies, by their nature, within the exclusive authority of the state and the control of others calls for coöperative arrangements between the state, county and city.

The factors, within the control of the state are: (1) enabling legislation permitting a broad sphere of municipal control of the disease, through all the necessary administrative and institutional arrangements; (2) advancement, if necessary, of such municipal or county administrative and institutional control of the disease, by state subsidy or special tax; (3) measures insuring a milk supply free from tubercle bacilli, before the milk reaches the limits of the municipality; (4) statewide educational campaign bearing on prevention of the disease; (5) state legislation bearing on conditions of labor responsible for prevalence of tuberculosis.

RESPONSIBILITY OF A MUNICIPALITY IN THE CONTROL OF TUBERCULOSIS.

One of the fundamental functions of a municipality is protection of health of its citizens. The recognition of the importance of this function is finding expression in the steady progress of our municipal health departments, from mere bureaucratic offices, poorly financed and inefficiently managed, with its narrow functions of "issuing permits," "abolishing" flagrant nuisances and "recording" mortalities, to real health departments, well financed and efficiently managed to fulfill the great function of promoting health and preventing disease.

Among the various phases of the municipal health problem, tuberculosis is naturally receiving growing recognition because of its widespread prevalence, its large number of deaths, representing about one tenth of the entire mortality (one third of the deaths occurring at the most productive period of life), a morbidity of various degree affecting at least one per cent. and latent infection impairing the health and working power of at least 10 per cent. of the population, the baneful influence on the general health standards and the resulting great economic loss.

The trend everywhere is toward gradual supplanting of the pioneer enthusiastic work of private anti-tuberculosis organizations by the more comprehensive, more correlated system of control of the disease by efficient municipal health departments.

In this period of gradual change from

private effort to municipal action, the time is most opportune for formulation of standards and right scope of municipal activities in the matter of control of this most widespread disease.

The Scope of Responsibility of a Municipality in the Control of Tuberculosis.

In the last two decades the scope of work of municipal health departments has grown in proportion to the gradual recognition of health as an important communal problem. The progress has been against many difficulties still existent. Chief of these are a part of the old order of things, in which municipal health offices occupied a subsidiary position, with many of their functions distributed among other departments of the city government. Constant opposition is being also manifested to the further expansion of control over conditions which the enlightened judgment of communities tends to place within the domain of municipal regulation.

With our present experience with the health situation in municipalities of this country, it is evident that efficiency calls for concentration of effort and authority.

Tuberculosis is a communicable disease and its regulation in a city should be absolutely within the domain of the health department. The problem of this, as well as other diseases, is, however, so interwoven with other conditions as to necessitate additional arrangements by which the health department may be a factor in the final decision of all municipal problems directly or indirectly affecting health.

Under this heading should be mentioned the following: (1) hygiene of streets and alleys; (2) freedom of air from smoke and dust; (3) extent of vacant space, including parks, playgrounds and space between buildings; (4) the health requirements in the architectural arrangements of homes, public buildings, schools and working places; (5) systematic supervision of health of school children.

The direct regulation of the disease itself, in the light of present experience, calls for: (1) notification of all cases of tuberculosis; (2) disinfection and renovation of infected premises; (3) dispensary control of all cases in their homes; (4) institutional provision including hospitals, sanatoria and open air schools; (5) a campaign of education on prevention of the disease.

It is apparent that the control of the entire tuberculosis situation, because of the communicable character of the disease and in the interest of efficiency, should be vested in a city in its health department, with sufficient funds and machinery to control the situation.

The Participation of City Health Departments in the Control of General Conditions Responsible for Prevalence of Tuberculosis.

It is apparent that the city tuberculosis problem can never be solved without the gradual eradication of all such general factors in the city environment which undermine resistance and favor infection.

Pollution of air, cleanliness of streets and alleys, hygiene of public places and conveyances, adequate provision

of light and air in buildings, overcrowding, school environment—all these factors are at present, in nearly all cities of this country, almost totally outside of even partial control by health departments.

Grave considerations of communal welfare demand an arrangement by which municipal health officers may not only exercise a controlling influence over the health requirements in the solution of all the above problems, but also have a well defined right of initiative in the suppression of conditions contributing to the prevalence of the disease.

It is apparent that with further enlightenment on all matters of health the authority of health officers in such matters will materially increase.

Efficient control of tuberculosis by city health departments necessitates the exercise of such authority.

Supervision of Health of School Children.

Supervision of health of school children is naturally one of the most important factors in the municipal control of tuberculosis. Two important features of this problem are engaging the attention all over the country; efficiency calls for their gradual solution.

One is the division of responsibility, at present in existence in many cities of this country, in the matter of systematic supervision of health of school children, with the view of control of communicable disease and advancement of higher health standards. The control of hygiene of school buildings is inseparably linked with this important function. Considerations of efficiency demand centralization of authority, either under a special bureau, with equal representation of the board of education and the municipal department of health, or, the authority should be absolutely vested in the health department.

Another important feature of the present situation is the lack of system and the inadequacy of the medical examinations of school children as conducted at present. The control of the standard of health of school children demands a system of thorough medical examinations, before entrance and at beginning of each school year, as well as a system of subsequent close supervision coupled with periodic reëxaminations.

Centralization of authority and greater efficiency of the present system of supervision are the two important problems to be solved in order to make the present system of school health work an important factor in the gradual eradication of tuberculosis.

Compulsary Notification of Cases of Tuberculosis.

Following the initiative of Dr. Hermann M. Biggs in establishing compulsary notification of tuberculosis cases in New York, the policy has been adopted and is in force in a number of cities of this country, with a variable degree of success, the proportion of living cases reported ranging at present from up to 90 per cent. of reported deaths to 80 per cent. of total number of living active cases (Manhattan).

Enforcement of ordinances requiring notification has, however, only an educational influence unless it is connected with efficient supervision and control of all cases so reported. The work falls within the province of tuberculosis bureaus of city health departments.

Disinfection of Infected Premises.

The object of disinfection is the destruction of all the infective material on premises formerly occupied by a case of communicable disease. This function is inherently within the domain of the health department. At best it is performed at present, in the vast majority of municipalities, in an incomplete way, with the results short of the object sought.

Actual elimination of infective material from premises calls for efficient disinfection coupled with thorough vigilance and thorough coöperation between the health department, the medical profession, the landlord and the general public. It requires sufficient funds for efficient work.

The municipal tuberculosis dispensary system, with its corps of physicians and nurses, is an important factor in the situation.

As in all matters pertaining to the control of tuberculosis, unification of effort is of vast importance.

Dispensary Control of Tuberculosis Cases.

The tuberculosis dispensary system, developed in this country, under the leadership of the National Association for the Study and Prevention of Tuberculosis, is at present one of the greatest factors in the control of tuberculosis in various communities. The American dispensary system, as it stands at present, is noteworthy for its gradual extension of control over the entire environment of the consumptive, including his family and all contacts.

The immense system at present in operation, has grown out of the effort of private anti-tuberculosis organizations. The tendency of the last few years has been toward gradual assumption of this function by state and municipal health departments where it rightfully belongs. We are now in a transitory period, impeded on one hand by the unwillingness of less enlightened communities to assume municipal control, and confronted on the other hand with the lack of system and centralization of effort due to dual or multiple management.

Municipalization of the entire tuberculosis dispensary system in every city, with further development of all arrangements for early diagnosis and efficient control, is of utmost importance to the gradual eradication of tuberculosis in our communities.

Institutional Provision for the Care of Tuberculosis in Municipalities.

The hospital system, for the treatment of advaneed eases, has grown in this eountry out of the initiative of religious and private eharity organizations. Most of the eounty tuberculosis institutional provision developed as a part of the eounty infirmary or poorhouse system. On the other hand, in the last thirty years, sinee the

foundation of the Adirondack Cottage Sanatorium by Dr. Edward L. Trudeau, a rapidly growing sanatorium system came into existence, partially under private, partially under state, county or city auspices, chiefly for the treatment of curable cases.

With the recognition of importance of tuberculosis in children, came preventoria, still in their incipiency.

Inadequacy of the existing institutional provision to meet the requirements of the situation is intensely felt even in the most progressive communities. Poorhouse methods still characterize the work of most of the county institutions, the spirit of leadership and tendency to progress being still limited to private sanatoria and hospitals or to a comparatively small number of state, county and city institutions built or developed in the course of the national anti-tuberculosis campaign of the last two or three decades.

Among the most palpable defects of the present institutional provision in most of the communities are the following: (1) lack of cohesion between the work of various institutions in the admission, care and after-care of their patients; (2) lack of coöperation between the hospital, sanatorium and dispensary systems; (3) lack of coöperation between the institutions and the health department in whom is vested the function of controlling communicable disease.

This disassociation of effort is a great impediment to efficient control of tuberculosis.

It is apparent that in cities with sufficiently large population, the health department must have complete control of the entire hospital, sanatorium and dispensary provision, with an additional arrangement in operation, by which all private institutions should become a coöperative factor in a unified and centralized system having for its object control and prevention of the disease.

It is very important that with this centralization of effort in the municipal health department, progress shall continue along lines of medical and administrative efficiency, unhampered by outside considerations.

Campaign of Education on Prevention of Disease.

Health standards are largely a matter of education. Efficient administrative arrangements for prevention and control of disease are impossible without recognition on the part of the community of the importance of the problem, of its causative factors, its relation to general welfare and its methods of prevention. Efficient control of disease cannot be attained without full coöperation of all elements in the community. The personal attitude of every citizen, in the matters of health, is of tremendous importance in the attainment of higher communal health standards and in the efficient enforcement of all regulations enacted with that point in view.

In the last two decades, an educational campaign on tuberculosis and the factors involved in its causation and prevention has been persistently carried on, chiefly by private anti-tuberculosis organizations. The country at large, no doubt, has more in-

formation concerning tuberculosis than any other disease. The information, however, is still rudimentary and is interwoven with a mass of misconceptions.

The lessons taught are frequently at variance with the attitude of the general practitioner and the policy pursued by local health departments. There is a great need of further spread of exact knowledge and adjustment of views by well directed methods of discussion and publicity.

The leadership in a widespread rational and effective educational campaign on tuberculosis must eventually be vested in health departments backed by enlightened medical profession and the people at large. The lesson must be carried to the people by means of all well tried methods including lectures, conferences, exhibits, etc.

Conclusion.

In the further development of the present arrangement for the control of tuberculosis, municipal health departments must gather strength, be given funds and acquire the support of the medical profession and the people at large, in directing a campaign against this most widespread disease of modern times. Efficiency calls for united effort with centralization of authority. The spirit that made possible the country-wide effort of private organizations must finally find its expression in the enthusiastic support given to modern health departments in full accord with their enlightened communities.

INCREASING ORGANIC DISEASE—THE NEW PUBLIC HEALTH PROBLEM.

Mr. E. E. Rittenhouse,
President Life Extension Institute. New York, N. Y.

Read before the General Session of the American Public Health Association, Rochester, N. Y. September 9, 1915.

WHAT we have to say here upon this subject of increasing organic disease will be of service to humanity only to the extent to which it encourages corrective action. My remarks will be in the form of an appeal for such action.

With this thought in mind let us take the shortest and simplest road to some of the important facts and fundamentals underlying this problem. Let us briefly consider the magnitude and significance of this heavy drain upon national vitality and the means of checking it.

Magnitude of the Loss.

Since the great war commenced a year ago, America has spent eighty million dollars to succor Belgium—a glorious charity. During the same year over 400,000 American adults died from the preventable or deferable diseases of the heart, arteries and kidneys, including apoplexy,—an inglorious sacrifice to ignorance and neglect.

Virtually all of these annual deaths are premature, as we well know, for they can be deferred by a proper observance of the fundamental laws of individual hygiene, and by adopting the habit of calling occasionally upon medical science for physical inspections for the purpose of detecting trouble in its incipiency, or when it will still respond to corrective measures.

It is safe to say that there are constantly at least 15,000,000 adults in America who have one or more of these organic diseases in some stage of development.

The period of development from the incipient to the serious stage of this class of diseases may range from weeks to years, during which time they may be detected by occasional physical examinations and checked or cured if given proper attention. The most of these 15,000,000 people are drifting into these slowly developing and deferable organic diseases unknowingly. The state neither informs them nor warns them. It is not interested in them.

And there is the question of human suffering and economic waste. It is impossible for us to visualize the 15,000,000 people who are, through ignorance or neglect, drifting into organic disease. Nor can we bring within our mental grasp a picture of the extraordinary total of suffering, sorrow, poverty, immorality, and financial loss caused by this needless sickness and premature death—but it is constantly going on, nevertheless.

The State and Philanthropy.

Americans are extremely generous in relieving distress from acute causes such as accidents, floods, earthquakes, epidemics and wars. And, if these

400,000 funerals with their millions of mourners occurred at one time, and could be visualized and pictured and described in the newspapers, educational funds to combat this enemy would be forthcoming in abundance.

But with all our fabulous riches, with all our wealth of scientific knowledge, with all the noble and charitable impulses of our people which prompt them to shower millions upon the unfortunate *after* trouble comes, we permit this enemy to ravish the nation unchecked.

Go to the philanthropist or the state and ask for advice in fighting organic disease and in effect the answer will be:

"We can do nothing for you. Wait till you are sick, then we will take care of you. We are maintaining hospitals for this purpose. We will even bury you, and send your children to an orphan asylum. We are very charitable, but we will guard you against illiteracy, accidents, and communicable disease only. Organic disease is an act of God."

Some Fundamentals.

For the consideration of those who are not in accord with the idea that the public health service should engage in this educational work, let us refer to a few fundamentals.

It is axiomatic that the primary purpose of organized society is to protect the lives of those who compose it. Hence, if it is a proper function of the state to protect a citizen from germ diseases, why not from degenerative diseases? If it is right to spend public money to guard against disease that may spread and injure the health of the community, why is it not right to guard against disease that is reducing the vitality of the nation?

The state now denies the citizen the privilege of killing his neighbor through ignorance or neglect of health precautions, but concedes him the privilege of killing himself by the very same method. In other words, the state goes to a great deal of expense to save a man from one disease to let him die prematurely from another without the slightest help or warning.

Is a life saved from typhoid fever of any more value to the state and to the family than a life saved from Bright's disease? Is it possible that it is right for the state to teach a citizen how to keep his premises in a hygienic condition, and wrong for it to teach him how to keep his body and its organs in a healthful condition?

There is little to be gained by extending the *extreme* span of life, but it is of vital importance to our country and to posterity that we at least check the shortening of the active, productive period of life.

Must we back away from this great problem of life-saving and of race protection because it is difficult, and continue to drift along the line of least resistance?

That is not the American way. This new burden has been placed upon us by the development of modern civilization and we must not shrink from it.

If the human wastage from this enemy were stationary or even declining, it would still be the imperative duty of American lawmakers, educators, doctors, health officials and the

press to make our people see this picture and to apply relief. How much greater, then, is the need for action when we consider the extraordinary increase which has occurred in the death-rate from organic diseases?

The Menace of the Increase.

The increasing waste of American vitality and life from degenerative diseases among wage-earners and other classes is rapidly reaching the magnitude of a national menace.

Certain members of the medical profession have for years believed that these diseases were increasing. But whether or not they were increasing out of proportion to the gain in population could only be determined by a thorough, tedious and somewhat expensive search and study of our confusing mortality records of former years, for comparison with the more complete data but still limited area of the present. Few have had the time or the inclination to undertake this task. It was done, however, and, with all allowances for inaccuracies, the result can be summed up in the statement that wherever comparisons can be had to cover a period of ten years or more, the crude records show a marked increase in the mortality from the organic diseases, and, as is well known, a decrease in the mortality from communicable diseases.

Time forbids any extended reference to statistics or a discussion of their reliability or the methods of arriving at the ratios. We may, however, consider some comparisons in tabloid form which have been worked out from the most reliable mortality data available. Please remember that these are presented, not to fix in the mind any arbitrary ratio as being mathematically certain, because such exactness is impossible in mortality statistics, but to indicate the trend, and to show how completely the records support the statement that an extraordinary increase has occurred in the mortality resulting from the giving out of the organs.

And also please consider this: By combining the mortality from the degenerative diseases, disturbances of the ratios by improvement in diagnosis or classification are obviated for such change and would not be apt to take them out of this group. Any advance in completeness or accuracy would be naturally too slight in the short period of the past ten years to account for the extraordinary increase indicated by the returns.

The U. S. Census records show that during a period of ten years in a group of occupied males numbering over 4,000,000, the increase in the death-rate from the degenerative diseases was 52 per cent. divided as follows:

	Increase, per cent.
Laboring and servant class	37
Manufacturing and mechanical industries	54
Agricultural, transportation and other outdoor workers	66

During the last census interval, 1900–1910, the death-rate among the general population from organic heart and circulatory diseases, kidneys, and apoplexy increased in eight registration states and cities as follows:

	Increase, per cent.
Maine	28
Massachusetts	20
Connecticut	23
New Hampshire	30
New York	19
New Jersey	17
Michigan	38
Vermont	35
Chicago	45
Cleveland	37
Milwaukee	30
Philadelphia	20
Cincinnati	43
New Orleans	24
Pittsburgh	53
St. Louis	30

These increases range all the way from 17 per cent. to 38 per cent. in the states and from 20 per cent. to 53 per cent. in the cities in the short period of ten years. They are confined to no particular section, race or condition.

In twenty years, 1890–1910, the increase (all ages) in the registration area was 41 per cent. divided as follows:

	Increase, per cent.
Heart and circulatory	46
Kidneys and urinary	50
Apoplexy and nervous system	32

In 1880 there were but two states and sixteen cities where the mortality records were sufficiently complete and reliable to be accepted by the national government. The states were New Jersey and Massachusetts and really constituted the so-called registration area at that time.

The indicated increase in thirty years, 1880–1910, in the death-rate from the heart, kidneys and apoplexy in sixteen American cities, and in New Jersey and Massachusetts (with paralysis, liver and circulatory diseases added in the latter) was as follows:

	Increase, per cent.
Sixteen cities	94
New Jersey	108
Massachusetts	86

It is a significant fact that the mortality from these diseases in England and Wales, Sweden, and other hygienically advanced nations has been either stationary or declined during these three decades.

In the general population in New York City, Doctor Guilfoy's comparison of a thirty year period shows a marked decline in the expectancy of life commencing with the group age 40–50.

Another interesting bit of evidence is found in the record of rejections of applicants for life insurance by a large American company. Out of 20,336 rejections, 8,782 or 43 per cent. were declined for physical impairments indicating the presence or the coming of these same degenerative diseases. This is especially significant in view of the fact that fully 90 per cent. of these 8,782 people were unaware of their condition and under the impression that they were physically sound.

The physical examination of a large number of individuals during the past year by the Life Extension Institute fully sustains the verdict of the general mortality records as to degenerative tendencies. These investigations have given new emphasis to the fact that the foundations of degenerative diseases are laid by a vast number of

people in the early years of their lives, and that these conditions are discoverable long before the individual knows of their existence.

To Sum Up.

To sum up, the best available evidence shows that American life waste from the degenerative diseases is excessive; that it is increasing rapidly, both in city and in rural population, and among the native and foreign born elements; that it is increasing in the younger age groups, but in greater ratio in middle life and old age; that this increased mortality has caused an increase in the general death-rate commencing with age group 40–50, and that these increases do not occur in kindred nations in Europe. In short, American vitality appears to be declining.

In view of the evidence may we not well consider these questions:

Warships, guns, forts and munitions for national defense are now subjects of serious public concern, and properly so. But is it not time to give thought to the physical efficiency of the men who are to handle these defensive weapons now and in the future?

How much longer may we hope successfully to meet the struggles of peace and war with the proportion of inactive, flabby-muscled, low-powered Americans constantly increasing?

How long can the nation endure with the physical fitness of its producers and defenders steadily declining?

The Cause.

However opinions may differ as to the cause or causes of these conditions, we now know that we cannot brush this problem aside by the simple process of assuming that the statistics are valueless, or that the saving of life from infancy to the early adult period from germ diseases has given us an increased number of weakened lives which may become easy victims of the chronic diseases in middle life and old age. Undoubtedly, this influence will affect the death-rate in the older ages in the course of time, but its present effect must be very slight, for the heavy reduction in mortality in early life has occurred almost wholly since we learned of germs and how to fight them, which is within the past three decades. Therefore, very few of these people are old enough to pass into the age group 40–50 and beyond. Again, it should be remembered that, while the same reduction in mortality from the germ diseases has occurred in the European countries, no corresponding increase in the degenerative diseases or in the general death-rate in middle life or old age has occurred there.

It is possible that some specific predominating cause will be discovered—perhaps among our numerous microscopic enemies—for the downward tendency of the American vitality curve.

The most common and plausible reason offered for this trend is found, however, in the statement that the changes in living conditions during the past two generations have been so rapid and so extraordinary that we have not yet had time to adjust our lives to them. We know that these changes have been much more radical and abrupt here than in Europe. It is

a matter of common knowledge that the high nervous tension under which Americans work and live is virtually unknown in other countries. There is also significance in the fact that during the past fifty years the proportion of our population which has changed from an outdoor to an indoor life, or from a physically active to a physically inactive life, has enormously increased. This has been caused by the marvelous gain in our wealth, in time-saving and labor-saving devices and in cheap transportation. With all this has also come a change in the nature and richness of our food.

There are millions of Americans who are living physically unbalanced lives as a result of these changes, to whose aid preventive medicine must come.

But aside from the cause of the increase in this life waste, the vital fact before us is that we now actually know of the habits of life which place excessive strain upon the heart, arteries and kidneys and cause them to wear out too soon.

Stimulating Interest.

And knowing this, is it not our imperative duty to bring this knowledge to the individual and to use our utmost endeavors to induce him to change these habits which are reducing physical efficiency and shortening the active, useful years of life? This being a national problem, the duty of leading in this great educational movement rests with the men of the public health service—local, state and national—who have been entrusted with national health defense.

The health service has already had marked success in spreading knowledge of individual and household hygiene as related to communicable disease. Think of the impetus that would be given to this broader movement, to include organic disease, if every health official in the country were doing his part to stimulate and educate the public upon this subject. We know that this can be done, if we develop a little crusading spirit and set about it.

The reason I feel so positive that this can be done is because of my own experience in helping to arouse interest in the increase of organic disease. A brief account of this experience may be of value for the encouragement of recruits to this health and life-saving cause, and it is therefore given with the hope that the personal reference may be pardoned.

This apparent increase in the degenerative diseases first came to my notice several years ago through my present colleague, Dr. Eugene L. Fisk. He was then medical director of the life insurance company of which I was president, and had already become interested in the subject. The importance of this *increasing* menace to national vitality impressed me deeply, and I determined to enlist permanently in the work of helping to secure public recognition of the seriousness of the problem.

At that time this adverse trend was quite generally ignored. So far as could be learned, no effort was being made to impress the professional world and the public with its significance and the urgent need for remedial action.

We searched and interpreted the

records. The results were given to the public through the press and by other methods. This work has since come to be very much broadened. Gradually help began to come. Slowly but surely professional writers and leaders in the general field of prophylaxis began publicly to discuss the subject in some of its phases. And now, thanks to this growing interest and help, the importance of the *increase* of degenerative diseases is in a fair way to be generally recognized as a problem of national concern.

In 1909 we established in the same company the first health bureau in a life insurance company for the purpose of giving free medical examinations and hygienic knowledge to policyholders, and with most gratifying results in the mortality rate of the group taking the service. At the same time the Metropolitan Life Insurance Company engaged on a large scale in another phase of health conservation, and has since included free examinations to a portion of its policyholders.

While insurance companies move slowly in such matters, their general concern in health conservation has increased, and a number of them, perhaps eight or ten, are now giving free medical examinations to certain groups of policyholders, and others are occasionally issuing educational literature.

Out of the growth of interest in this general subject developed the sentiment that found concrete expression in the organization of the Life Extension Institute. This was done not by the insurance companies, as many suppose, but by Mr. Harold A. Ley and his friends, with the enthusiastic and effective support of Professor Irving Fisher who was a prominent and early pioneer in this movement, and also of former President Taft.

It is important that the growth of this campaign to stimulate interest should be known, that those who wish to help may not be deterred by the scepticism of the same type of friends who assured us several years ago that our efforts would be fruitless.

Help from the Health Service.

Now, if this much can be accomplished by the comparatively small group of people engaged in this educational campaign during the past few years, what may we not hope to accomplish during the coming five years, if the public health service—local, state and national—throughout the country joins in the good work?

We know that a few health officers are already moving in this direction. The New York State Health Department has taken up this educational problem and a part of the state traveling exhibit is devoted to degenerative diseases. The New York City Department has examined a number of city employees and is urging the public to adopt the habit of health examinations. It has also taken up organic disease. It would repay any one to read the papers of Doctors Shipley and Emerson of that department upon this subject.

Recently the United States Public Health Service issued a valuable educational pamphlet by Dr. F. E. Smith on exercise and health, in which attention is called to the lowered expectancy of life above age 40 and to the need of

combating the increasing diseases of degeneration.

There are, doubtless, other departments working in this field of which I am not informed. I know that Doctor Rankin of North Carolina, Doctor Woodward of Washington, D. C., Doctor Hurty of Indiana, and a number of other health officers are deeply interested and have given it attention. I am sorry I cannot recall the names of each of them. The wonderful achievements of the public health service in combating communicable disease has compelled public confidence. The average health officer has much more influence with the public than he imagines, if he will but exercise it.

We have had two conspicuous instances at these meetings. The Governor of New York said here two nights since:

"I have good hope, now that the problem is clearly recognized, that your efforts to induce the public to observe the rules of personal hygiene and to undergo a periodic medical examination for the detection of these diseases at a curable stage will bear fruit in the near future. I shall personally make every effort to follow moderation in all things."

Secretary Redfield of the President's cabinet, said last night:

"If I am correctly informed, we know what is to be done and how to do it, and we have the organization through which the saving of this pain and of loss can be effected. We lack as yet the vision out of which must come the impulse to do."

It was through public health officials that these prominent leaders have become informed and interested in this subject.

Any health official or physician who does not know the modern rules of individual hygiene can inform himself with a reasonable amount of reading. He can soon learn of the habits of eating, drinking, working, resting, playing, that injure the organs and of those that tend to conserve them. If he will keep these rules before the public as much as possible, he cannot help but make an impression upon the minds and lives of many people.

Things To Do.

For instance, by persistently urging the formation of "hiking" clubs to enable people in sedentary occupations to get natural outdoor exercise at least once a week, "hiking" clubs will soon become the vogue in that community—as I understand they are now in some towns. Why not officially encourage the outdoor habit?

Every health officer knows there should be a course in personal hygiene taught in both the elementary and the higher grades in public schools. Why not advocate this?

Every health officer knows that the public should study and observe the common laws of individual hygiene. He also knows that every citizen should go to his doctor periodically for health examinations as a simple, sane preventive measure. Why then should every health officer not make it his permanent policy to urge the people by bulletins, press articles, lectures, etc., to adopt these very sensible health and life-saving habits? Why

not try it? Are not these endangered lives worth the effort?

Aid can be secured in this new educational work by interesting private physicians, medical societies, civic bodies, social organizations, religious organizations, colleges, public school officials, insurance agents' associations, fraternal insurance orders, charitable and relief societies, moving picture theatres, public service corporations, other employers of men and women, and newspapers and magazines.

Some of these agencies will help distribute hygienic literature, some will assist in securing audiences and even lecturers, and to promote exhibits, health day exercises, etc. In fact, if the health officer will but lead, if he will lay out an educational campaign for the year, and earnestly and patiently push it, he will open up a splendid new field of usefulness and with little cost to the public.

In the work of the Institute, we are constantly sending many people to their doctors, their dentists, their oculists. Therefore, we know from experience, as well as from the history of recent years, that the people will heed hygienic advice. They will learn, but they will not educate themselves; they must be taught. And they must depend largely upon the medical profession and the public health service to lead them from the ignorance and folly which is now costing so many precious lives and threatening the vitality of the nation.

Conclusion.

To quote a few lines recently from the pen of Professor Irving Fisher: "Hygiene has repudiated the outworn doctrine that mortality is fatality and must exact year after year a fixed and inevitable sacrifice. It aims instead to set free human life by applying modern science. A science which has revolutionized every other field of human endeavor is at last revolutionizing the field of health conservation. . . ."

"Thoroughly carried out, individual hygiene implies symmetry, and beauty; it enormously increases our capacity to work, to be happy, and to be useful; it develops, not only the body, but the mind and the heart; it ennobles the man as a whole."

In conclusion, let us paraphrase the famous civic oath of the Athenian youth, and make it refer to health, instead of the city; and let us hope that the time will come when this sentiment is displayed and observed in every school and home in the land.

"We will fight for the ideals and sacred blessings of health, both alone and with many; we will revere and obey the hygienic laws and do our best to incite a like respect and reverence in those above us who are prone to annul or to set them at naught; we will strive unceasingly to quicken the public sense of hygienic duty. Thus, in all these ways, we will transmit this human body not less, but greater, better and more beautiful than it was transmitted to us."

THE MARRIAGE HEALTH CERTIFICATE, A DEEPLY ROOTED SOCIAL PROBLEM.

Dr. Oscar Dowling,
President Louisiana State Board of Health.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

AS SUGGESTED by the subject, the marriage health certificate, in application under present conditions, implies discussion of a complex problem. It has legal and social aspects and relates in both to the fundamentals of the social order.

The text of the recent decision rendered by the Justices of the Supreme Court of Wisconsin in the case of *Peterson* v. *Widule* is an excellent exposition of the legal phase of the question. You are familiar, no doubt, with the history of the incident. The act was passed in 1913, went into effect January 1, and the test case instituted June, 1914. The act provides that male persons making application for license to marry shall within fifteen days prior to such application be examined as to the existence or non-existence of any venereal disease; that it shall be unlawful for the county clerk to issue a license to any person who fails to file a certificate setting forth that such person is free from acquired venereal disease; this to be determined by physical examination and by the application of the recognized clinical and laboratory tests of scientific search, the certificate to be made by a physician; further, that the examiners shall be duly licensed physicians of at least thirty years of age, and the fee not to exceed three dollars ($3). If applicant be indigent, the county physician is required to make the necessary examination without charge. In the event of a dispute or disagreement as to findings, tests made in the state laboratory of hygiene are required and accepted. If the applicant claims unfairness in examination, he shall be entitled to a hearing before the judge of the county court, without jury. The penalty for issue of license without certificate is imprisonment not less than one year nor more than five years. For any physician who knowingly and wilfully makes a false statement the punishment is the same as for perjury, also that the license of such physician for practice in the state shall be revoked.

The petitioner in the case just decided by the Supreme Court presented himself to four physicians for examination tendering each the statutory fee of three dollars ($3). Each refused, because the fee was not sufficient compensation for the Wassermann test for syphilis which they deemed necessary before signing the certificate. The petitioner renewed his application for a license without a certificate which was refused; he then brought action and was given favorable decision. From this judgment the county clerk appealed. Three justices of the Su-

preme Court concurred in declaring the law valid, two gave dissenting opinions.

The law was held unconstitutional by the trial court because it is an unreasonable restriction upon the inalienable right of marriage; it impairs the inherent right to enjoy life, liberty and pursuit of happiness; it interferes with religious freedom.

Justice Winslow in his decision says, in favor of the law, "some general fundamental propositions which are not open to question may probably be stated. The power of the state to control and regulate by reasonable laws the marriage relations and prevent the contracting of marriage by persons afflicted with loathsome or hereditary diseases which are liable to be transmitted to the spouse, or inherited by the offspring, or both, must on principle be regarded as undeniable. . . . Society has a right to protect itself from extinction and its members from a fate worse than death."

It may also be assumed that any legislature in the passage of such a law had as its purpose the safe-guarding of marriage and not its prohibition. In reply to the contention that the law interferes with religious liberty, Judge Winslow in his argument states, "We know of no church which desires its ministers to profane the marriage tie by uniting a man afflicted with a loathsome disease to an innocent woman." In concurrence with the opinion expressed as to the constitutionality of the law, Justice Timlin, while not in sympathy with the provisions of the statute, bears witness to its validity in his opinion that "The exercise of all constitutional rights is subject to reasonable legislation to the public interest under the so-called police power of the state. Before the statute in question could be declared invalid on this hypothesis it must appear that the statute was not at all conducive to the preservation of public health, welfare or morals, or that it carried regulations to an unreasonable or unnecessary extent and so as to interfere seriously with constitutional rights." The Judge concedes the power to require a marriage license also power to require of the license reasonable qualifications. He adds, "I cannot imagine how this law can be said to interfere with freedom of worship or liberty of conscience. A notion that marriage was a sacrament, not a civil contract creating a status, once vigorously asserted, has long since passed away."

On the other hand, Judge Marshall in his dissent says, "to marry is a natural right. . . . To regulate natural rights is necessarily limited to safe-guarding those rights. . . . That which conserves is constitutional while that which is so unduly oppressive as to materially impair is unconstitutional. . . . The marriage right is a proper subject for legislative legislation but not for legislative destruction or material impairment. . . . According to all evidence in this case enactment in question means one thing and can not reasonably be said to mean anything else, and all concede that given such meaning, it is unquestionably a destructive interference with the marriage right. . . .

The penal clause seems to be in the class with those found fatally unusual and unduly oppressive." Justice Marshall concludes with this, "An act of the legislature regulating civil conduct establishes public policy within the scope of legislative power; but when the enactment contravenes the higher public policy enshrined in the fundamental law, the latter prevails and the former is not law at all."

One of the main arguments of those opposed to regulations of this character, in Wisconsin and elsewhere, is that the law singles out men about to marry and makes a class of them. So strongly was this urged in Louisiana by the opponents of a bill proposed this spring in the General Assembly that an amendment was brought in including women. The reply to this by Justice Winslow is convincing. In substance he says, "Medical evidence in the case corroborates what we suppose to be common knowledge, namely, that the great majority of women who marry are pure, while a considerable percentage of men have had illicit sexual relations before marriage, and consequently that the number of cases where newly married men transmit a venereal disease to their wives is vastly greater than the number of cases where women transmit the disease to their newly married husbands. . . . The question is not whether in some individual instance there is any perceptible distinction, but whether there are characteristics which in a greater degree persist through the one class than in the other, and which justify the different treatment. That there are such characteristics in the class of unmarried men is as certainly true as it is discreditable to the male sex." It follows that legislation against males alone for the purpose of preventing the transmission of venereal diseases is clearly within the police power of the state and just as clearly is not discriminatory.

Though the act clearly states the applicant shall present a certificate showing freedom from acquired venereal diseases, its opponents urge that tests even for this, form a "destructive interference" with the marriage right. It is claimed and rightly that few physicians—unfortunately very few—are sufficiently familiar with certain tests to apply satisfactorily and many with experience and knowledge are without the office equipment necessary. In addition, a fee of three dollars ($3) is unreasonably small for any laboratory test. It is argued that our knowledge of the prevalence of those diseases in civil life is so inaccurate we have no just ground for insisting that a man submit to the inconveniences and humiliation of an examination. Also that laws which make marriage expensive, difficult, or subject to objectional requirements tend to increase illegitimate relations which in turn tends to the spread of these diseases.

There are some phases of the operation of the law which are legal, yet have a personal—social aspect. One of these, the examination in its relation to the applicant, the physician and the clerk who knows the findings. Men who realize they may be refused a license will, it is claimed, evade the

law; or do their utmost to influence those who are concerned in its execution. Redress, too, in a trial means publicity obnoxious to the applicant and to those associated. Trial by a jury is objectional, but trial by the judge alone is not considered by some due process of law. Lack of "machinery" and the undesirability of delay are obstacles which must be considered.

It will be conceded that the marriage right is a proper subject for legislative regulation, also that the means of regulation should be legitimate and the degree of restraint not unduly oppressive. Do the objections noted place an act of this character beyond the purview of the state? I believe not.

As marriage is an institution absolutely essential to public welfare, it is a necessity to the permanence of the state; it should be protected by the fundamental law. But society, the state, is made up of individuals, and the well-being of the state depends upon the character of the units which make up the sum. While we do not know the exact number of men who walk daily the streets of our cities afflicted with a form of infectious disease which may, or will, be transmitted in the event of marriage, we do know that there are a number. In 1913, 10,625 cases of syphilis alone were reported in New York City. Dr. A. Prince Morrow is quoted by Dr. A. Corbett-Smith (June, 1914, *Journal of State Medicine*) as having estimated including those infected with gonorrhea as well as syphilis, the number to be 200,000. To quote further from figures by Doctor Corbett-Smith, in 1911 in Siberia, the official report of syphilis was 57,360 out of a population of nine and a half millions. In the whole Russian Empire for the same year the number recorded was 1,265,000 cases of syphilis in all its forms. The population of the Empire is given at 167,520,000, thus there were infected 75 per 10,000 of the population of a territory representing one sixth of the land surface of the globe. Accepting the figures of Berlin of incidence (given by Doctor Corbett-Smith) of syphilis, recent and standing cases the average of this disease is 18 (1.57) per thousand of the total population—of the one disease alone.

Reports of the army and navy give us some idea of the prevalence of these diseases; and if, as claimed, they are much less common in civil life, there are still by far too many infected for us to remain quiescent if there are means of prevention at hand.

If we have no accurate figures as to prevalence of these diseases, even less have we a body of definite facts as to their effect. But observation and inference give conclusions which make us pause. You are familiar with recent investigations of causes of insanity, paralysis, blindness, of attempts to trace the physical history of inmates of prisons and homes for the unfortunate. Without complete knowledge, those open to conviction feel assured that the state should no longer fail in its duty to its unborn citizens.

Do you remember reading of a divorce suit recently instituted in which the husband, a physician, pleaded his wife be given her freedom. "I should not have married when I did

six years ago. I knew then I was doomed to become a hopeless paralytic. Within a year of our marriage I was unable to walk about and the young and blooming girl I had married ceased to be a wife and become merely a sick man's nurse. She is strong and beautiful and she should not be hampered with a worthless body like mine. I ask that you set her free." Could there be greater agony? Yes, had there been children, with the possible—probable—inheritance of a weak spine or defective brain.

I think I do not minimize the difficulties of enforcement of a law of this kind. The expense incident to the individual, the state; the lack in many sections of trained men to act as examiners; the publicity involved in failure to pass the examination, and the apathy of county officers already underpaid and (where they work) overworked, are some of the legal obstacles—if I may so term them. But to my mind these are less important than the attitude of the people which is the social aspect. Men feel competent to protect their daughters; they resent interference, and this in spite of the fact that there is little done to safeguard girls from suitors known to be frequenters of the "primrose path"; naturally every prospective wife has faith in her own judgment. The candidate feels that the requirement casts, unduly, suspicion of immorality on him; and without doubt the incompetency of many examiners would result in unnecessary delay, it might be in grave injustice.

Perhaps, more deeply rooted even than these, is the innate reluctance of our people to discuss frankly sex questions, or to reflect that there is an obligation due the unborn. Knowledge of the most elemental principles of sex relations and danger from transmissable diseases, venereal and others, is not thought of as imperative in the instruction given young people. Fathers, mothers, teachers and physicians alike shrink from the rôle of instructor in this subject so vital to the welfare of the boy and girl, young man and young woman, the community, the state, the nation. We shirk mainly for two reasons—one, the custom of the ages has been to let youth discover for itself, often to its own undoing; second, we are doubtful that we can teach as we should.

I regret to acknowledge that men who know better than the layman, men of the medical profession, fail in their duty to the innocent and to society. In common with many physicians, I have personal knowledge of the sorrow and suffering that has followed in the wake of marriages which should never have been sanctioned. Two instances of recent date occur to me. A young man after months of waiting gained from his physician reluctant consent to his marriage. It was consummated and his wife, three times within five years, has suffered severe operations. She is a mutilated, unhappy wreck. I know another case, which in effect upon the woman was even worse, and this man was a physician himself. Hundreds of instances could be cited where the doctor from a spirit of mistaken kindness, or lack of firmness, became responsible for the mistake. Gener-

ally a man who is sufficiently conscientious to go for treatment, who asks advice, will, if the physician be insistent and steadfast, obey directions. I think it cannot be too strongly urged that there should be no compromise on the part of the medical adviser. He, more than any one, can realize beforehand the certainty of misery as a consequence. Physicians have here a great opportunity to raise the standard of honor and justice toward women; they have opportunity to teach the layman as no one else can teach, and it is to them, both as professional men and as individual members of the community, that society must look for gradual introduction of the proper regulation of marriage.

While I have dwelt on venereal diseases as important in this connection, I do not wish to be understood as believing that they alone should be considered. I recognize that at present our knowledge of effect of other diseases is of such character that it does not carry conviction to the lay mind—in fact, what we have on the venereal diseases is doubted by many, but in time, with others who hope for a day of ideal health conditions, I feel that the state will require much more than freedom from just one class of physical ills.

An intelligent presentation of the legal, socio-legal, and purely social phases of this subject would involve discussion of many fundamental aspects of our social order. I have, therefore, given only suggestions as to its complexity and its relation to established customs and modes of thought. Like all other desired changes in civic life, it will come only when an intelligent, enlightened public makes the demand, and as public conviction is wrought only through education, it is to this we should turn our attention. The operation of these laws in Wisconsin and other states will be followed with interest. Experience in the application, mistakes, failures and successes will be a means of dissemination of information, and will be an aid to legislators and health officers of other states who are willing to submit to the adverse criticisms incident to the establishment of similar regulations.

In looking forward to the era of regulation of marriage when science will give positive data as to the fit and the unfit, and the state will put forth its strong arm for race betterment, I am not unaware of the deeply rooted opposition which must be conquered, nor of the fundamental changes in the social mind which must be brought about; neither do I hope that this may come quickly. But a retrospect of the past gives us courage to stand steadfast for whatever may mean ultimate good for the individual and society and even in the dim light of present knowledge daily growing stronger and brighter, we know that inevitably control and direction of public health will be acknowledged the most vital function of the state.

Discussion.

Doctor Ruehland (*Milwaukee*): My only excuse for taking up the Section's time at this moment is that I have come from the state of Wisconsin, which has been quoted in connection with this eugenic law, and I am for that reason in position to state something of the effect this law has had with us. Not only have I followed its effect as a health official, but I have been brought closely in connection with this particular litigation, inasmuch as I was retained by the state as one of their witnesses, on the technical side of the laboratory tests which have been asked for. Now that we have this law and have it sustained by the courts, it is the opinion of everyone, the profession as well as the courts, that it is an exceedingly badly drawn law. Everyone will admit the desirability of some regulation, but everyone felt that the wording of this law was exceedingly poor, not only because it is class legislation directed against men only, but also because it asked for a form of examination which, under the provision for compensation made could not be performed, with the consequence that at the present time no one regards those qualifications of laboratory tests, even before legal opinion was had as to whether a Wassermann test or a compensation test should be made; physicians disregarded it generally because they said it is an impossibility and we will not make such examinations at a stipulated fee of $3.00. That is a practical point and it is on practical points that these questions will be decided. It would seem that a law calling for protection on the ground of eugenics should not confine itself purely to the venereal problem. There seems to be no reason why a tuberculosis history, why a history of epilepsy or astigmata of whatever nature should not be brought within the scope of this question and be dealt with likewise if we are going to protect ourselves against an unfortunate progeny likely to become a burden upon the community; and in any other state legislation along this line, I think they had better take these things into consideration and word their law broadly enough that it will mean an examination of the marriage candidates by a physician without qualifying just what it shall be, but trusting somewhat to the honesty and honor of the physician that he will act for the best protection of the community.

Dr. W. F. Snow (*New York*): There are 11 states in the United States now that have fragmentary laws that are worse or better, as the case may be, than the Wisconsin law, and there are perhaps 25 other states in which the women's clubs of the state contemplate introducing legislation in this direction this next winter, that is in January. Now there is being held, I think this same week, in Texas, a conference of the State Charities Aid at which health officials and the medical profession are coöperating with the State Charities Aid in a study of the framework for a model law for introduction into that state. I think that is in line with the chairman's statement about the venereal disease problem, that these things that are happening and these determinations in one state after another affecting important groups of citizens—legislation along these lines—makes it necessary that we, as health officers, should study the problem so that we may intelligently either discourage that legislation or direct it into channels on practical lines as the last speaker has indicated. The General Federation of Women's Clubs has three pieces of legislation on this particular subject that they are determined shall become part of the laws of all states; first, the reporting of venereal diseases; second, this health certificate for marriage; and third, the adoption of some such law as the Iowa abatement law. Now I wish to point out that this is not an altogether academic problem any longer with health officers. They must be either in a position to direct this force of citizens and debtors, or, if the health officer does not take this up and study it carefully and arrive at his own decisions, he must expect to be set aside as useless to the people, because they mean business in this whole field of the control of social and medical issues of the venereal disease problem.

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CRIPPLING THE HEALTH DEPARTMENT.

The Cincinnati Health Department is facing the necessity of abandoning a number of important services which have hitherto been maintained, on account of a lack of funds, which in turn is due to an unsound system of taxing laws. The budget for the department for the year 1916 is reduced 35 per cent. below the amount allowed in 1915. Here is a noteworthy example of what ought never to have to be recorded in writing the history of an American municipality.

Here is a department which has been conducted with an extremely high degree of efficiency and success and which has been furnishing the people of the city with a protection quite as valuable as that furnished by the police or fire department. The death-rate has been reduced and the city recently had the remarkable experience, for a city of this size, of passing through a week in which there was not a single death from any of the acute infections. It is hoped that Cincinnati may soon appreciate what its health department has accomplished and may take steps to correct the grave mistake which has been made at the earliest possible opportunity.

THE ROCHESTER PATENT MEDICINE CONTROVERSY.

There appeared in the *New York Tribune* for Sunday, September 19, an article by Mr. Samuel Hopkins Adams, entitled "Doctors Hoodwinked by Nostrum Men." Some of the members of the American Public Health Association may have seen this article as the result of an advertisement concerning it which was sent out by the *Tribune*. The Secretary of the Association felt that this article did the Association a grave injustice and he therefore addressed to the editor of the *Tribune* a letter setting forth the facts upon which the article in the *Tribune* was constructed. This letter, which was printed in the *Tribune* on Wednesday, September 29, is printed herewith, in order that any possible misunderstanding

of this affair on the part of members of the American Public Health Association may be removed.

American Public Health Association,
755 Boylston Street.
Boston, Mass., September 21, 1915.

To the Editor of the Tribune.

Sir: The article by Mr. Samuel Hopkins Adams in Sunday's *Tribune* does a grave injustice to the American Public Health Association and the conduct of its recent meetings at Rochester. This article represents that the patent medicine interests were able to insinuate their influence into the proceedings of the Association (despite no fault of omission or commission on the part of the officers of the association—which Mr. Adams admits) so that the members were deprived of hearing a lecture on patent medicines by Dr. O. M. Leiser, of the New York City Department of Health. Mr. Adams specifically states that "through some management or mismanagement" Doctor Leiser's patent medicine arraignment "was eliminated from the American Public Health Association meetings."

Allow me to state that this representation of the situation is absolutely incorrect. Doctor Leiser's paper was not eliminated from the meetings of the American Public Health Association; for the simple reason that it never had a place on the association's program. This paper was originally scheduled on the New York State Sanitary Officers' Association's program, and any responsibility for its being shifted to another date lies elsewhere than with the American Public Health Association.

Possibly Mr. Adams's mistaken idea is a result of Doctor Goldwater's original mistake in addressing Doctor Leary as "Chairman, Arrangement Committee, American Public Health Association." Doctor Leary was chairman of the general committee of the local public health association but had no official connection whatever with the American Public Health Association.

Allow me to say that I am in entire sympathy with Doctor Leiser's paper, and with Mr. Adams's splendid work in fighting the patent medicine fraud. At the same time, in fairness, it should be said that the lecture was given in full and at one of the largest meetings of the entire conference, at a meeting dignified by papers by Surgeon-General W. C. Gorgas and State Health Commissioner Dr. Hermann M. Biggs, and one to which the members of the American Public Health Association had been invited long in advance.

I wish also to make it plain that the 5,000 pamphlets referred to in Mr. Adams's article were not sent to the American Public Health Association and were never offered to the association for distribution to its members.

I trust that you will correct the impression that Doctor Leiser's paper was ever scheduled to appear on the program of the association's meetings or that the patent medicine interests in any manner "hoodwinked" the officers or members of the American Public Health Association. I beg you to give this letter prominence equal to that of Mr. Adams's article.

Respectfully yours,
Selskar M. Gunn.

CERTAIN SANITARY ASPECTS OF CANDY MANUFACTURE.

EARL H. CUMMINS,
Boston, Mass.

THE purpose of this paper was to study the rate of death of different types of bacteria, pathogenic to man, in candy. At the same time special attention has been given to the rate of death of bacteria found in commercial grades of confectionery together with the peculiarities of certain types common to chocolate. The object in studying the rate of death of pathogenic forms has been to find out if certain diseases could be carried by confectionery. This was only possible to determine by inoculating candy of different kinds with each of the pathogenic organisms to be studied and to note the falling off in numbers from day to day. Special attention has been given to the diseases of children, for the reason that candy is looked upon as being a food product consumed in large quantities by children and as a result such disease-producing organisms as B. pertusis and B. diphtheriæ have been studied with considerable detail. At the same time I deemed it wise to study the rate of death of other disease-producing organisms among which may be represented B. typhosus, B. paratyphosus, both A and B, B. choleræ, B. tuberculi, together with the non-pathogenic organsim B. coli. Each of these have been studied in different varieties and in different grades of confectionery with the results that will be found later on in this study.

HISTORY OF THE CONFECTIONERY INDUSTRY.

From time immemorial the human race has regarded the natural products possessing a sweet taste, a delicacy. Even in Biblical times the sweet honey was looked upon as being one of the rare things used as a present (Genesis 43:11). The flowers and bees were then the candy factories and there was no need of sanitary control—when the people found that certain plants possessed juice rich in sugar the history of the candy industry began and then sanitary regulations became necessary for the proper manufacture of sweet products. The Romans were very proficient in the making of fancy sweets and along the Appian Way many booths were erected to dispense the sweet products to the traveling public. Caesar in his miscellaneous writings alludes to the children's desire for coins with which to purchase the sweetmeats so desirable to their tastes. Cicero in his writings alludes to "the filth and reeking sickness" hidden in these sweet products and it can be accredited to Cicero to first see the need for some control of the manufacture of such products, for he says "seek out those doing harm and put punishment on their heads." When we stop and think that such an agitation was inherent in Cicero, it is hard to understand how so little has been

done for the confectionery business, until the confectionery manufacturers themselves saw the importance of their industry a few years ago and began big revolutionary changes.

Review of Literature.

A great deal has been written on sanitary food products and many methods have been devised for testing the cleanliness of foods. It appears strange that so little attention has been paid to the subject of confectionery by the general public until recently. When one stops to consider the vast amount of confectionery consumed in a single year it is surprising that such a branch of the food industry has been entirely overlooked. Yet this is not to be entirely wondered at, for only recently has confectionery been looked upon as a real food product. Heretofore it was always looked upon as being a luxury, hence the fact that so little attention has been paid to the sanitary conditions existing in the manufacturing and handling of confectionery.

Nearly all books on the examination of food products contain a short chapter on the examination of confectionery. In nearly every case this chapter deals with the chemical examination for the presence of certain injurious substances formerly present, in many cases, in confectionery. In no instance have I been able to find a chapter dealing with the sanitary side of the question. In the book by Jago on "Bread Making" there is to be found a very good chapter dealing entirely with the examination of raw materials that go to make up confectionery. This deals with the detection of impurities in glucose, with the detection of certain undesirable coloring materials and with the detection of certain poisons liable to be present.

Prescott seems to be the first to give any data on the sanitary side of the confectionery problem. This first reference to sanitation and hygiene in the candy industry was a paper presented at the Thirtieth Annual Convention of the National Confectioners' Association held in Cleveland, Ohio, in June 1913. In this paper he deals largely with the possibilities of infection and states in a general way that all of the sanitary measures taken in other industries should be as properly applied to the confectionery business.

Reference is made to four factors as influencing the sanitary conditions of commercial candy manufacturing. The first of these is the plant itself, in which he deals with general cleanliness of windows, floors, walls, ceilings, character of construction and arrangement, ventilation, light, freedom from dust, cleanliness of machines and all sanitary arrangements. The second is the testing of raw materials in which he mentions the examination as suitable for use of raw materials, for harmful substances and for the presence of undesirable bacteria. Little thought, no doubt, has been given to types of bacteria that are harmful to the consumer of candy, and the entire reference is to undesirable types of bacteria that may be found in commercial candy which will prove detrimental to the manufacturer and the retailer. A further discussion of this will be given at a later

period. The third factor influencing sanitation in the candy industry is the study of operations. To this little attention has been given, although it is hinted that it is an important factor. Certain general suggestions as to the replacement of all hand operations by machine operations are given and the possibility of obtaining an inoculation on the candy of diphtheria, typhoid or tuberculosis is mentioned as may result from the wetting of fingers in the picking up of wrappers. The fourth factor influencing sanitation is the personal hygiene of the operatives. This is closely related to the first division of the plant as a whole, for it is only possible to have personal hygiene of the operative when the plant as a whole is in a sanitary and up-to-date condition.

Olson, in his book entitled "Pure Foods—Their Adulteration, Nutritive Value and Cost," has a chapter on candies in which he deals largely with cocoa and chocolate. The chapter is entirely devoted to the chemical and physiological side of the problem, and no attention whatever is given to the sanitary aspects of the candy industry. He discusses the use of each of the raw materials that make the larger part of confectionery in a very brief manner and leaves the rest for the reader to imagine.

Wanklyn, in a book published in 1874 entitled "Tea, Coffee and Cocoa," deals in a brief manner with the analysis of cocoa and chocolate. These analyses are as good as any other published more recently but are purely chemical.

Whymper, in "Cocoa and Chocolate—Their Chemistry and Manufacture," deals at length on the history, botany and agriculture of cocoa in which he takes up the history and growth of the cocoa industry, the nature of soils necessary for the growth of the plant and its manufacture. An excellent chapter is given on the chemistry of cocoa.

In beginning such a work as to try to find out if confectionery could carry diseases it was my desire to find if there were any epidemics of any diseases supposed to have been caused from confectionery. This fact I have found to be a hard one to settle either way, although it is true that epidemics have never been directly traced to confectionery. Many sporadic cases of typhoid, if the real history of them were known, no doubt would find their beginning in an infected piece of candy.

The National Confectioners' Association of America is very anxious to investigate all cases of sickness supposed to have been caused from eating confectionery, and in a small book published in 1907 entitled "Facts" is given, "A compilation of various newspaper reports on the subject of supposed poisoning by candy and investigations of the circumstances by our Association." In the foreword of this interesting book is found this statement: "The investigation covers every case brought to our notice and extends over a period of twenty years." It is highly gratifying to know that in all this time not one case of actual candy poisoning has been found to exist except where the poison was actually put into the candy by persons bent upon

mischief or murder. Any sickness that has resulted from eating candy has, in every case, been found to have been caused by indiscretions which would have produced similar results in eating any other food product. This Association offers a reward of $100 for evidence sufficient to start prosecution against any dealer using poisons or injurious ingredients in confectionery.

The Importance of the Confectionery Industry.

The importance of the confectionery industry in the United States is best explained by saying that in 1910 there were employed 54,854 people in 1,944 establishments. This gives it a rank of 27 as compared to the employment of operatives. This is even in excess of such large industries as butter and cheese making, smelting and refining of copper, iron and blast furnace working, flour and grist mill products and the petroleum refining. The value of the products was $134,796,000 in 1910 throughout the whole country. This gives it a rank of 38, being in excess of cars and steam railroads, not including operation of railroads, and leather goods. The value added by manufacturing to the product amounts to $53,645,000, giving it a rank of 32. Some people would naturally suppose that a pound of sugar when converted into candy would bring perhaps one of the largest profits made by any industry. The ranking shows that this is not the case, for it only ranks 32, few products ranking lower than this one.

In Massachusetts the industry ranks fifteenth among all the large industries that the state offers. Throughout the entire state are located 117 establishments, of these 62 are owned by individuals, 16 are firms and 39 are incorporated. The number of establishments and their value may best be seen by table I.

The number of wage-earners employed in the factories throughout Massachusetts in 1910 was 5,548. The thirty odd candy manufacturing concerns in Greater Boston represent an investment of approximately ten million dollars. Their yearly production of candy amounts to over one hundred million pounds. These statistics make Boston the leading candy producing center of the world. It is said that there is a dime of local capital invested for each pound of candy produced, figuring on the annual output. The confectionery houses, shown in table II, located in Greater Boston show in a measure the capital and the estimated production in pounds.

These ten companies represent $6,876,900, with an estimated production of 83,800,000 pounds per year. This in a measure shows the necessity for proper control of such a large industry.

TABLE I.

Establishments worth less than $5,000	17
Establishments worth from $5,000 to $20,000	38
Establishments worth from $20,000 to $100,000	34
Establishments worth from $100,000 to $1,000,000	25
Establishments worth over $1,000,000	3

TABLE II.

Name of company.	Capital output.	Estimated production in pounds.
N. E. Confectionery	$1,529,400	32,000,000
Package Confectionery	1,475,000	2,000,000
W. M. Lowncy Co	1,000,000	15,000,000
F. H. Roberts	900,000	3,750,000
Boston Confectionery	700,000	5,000,000
H. D. Foss & Co	450,000	2,800,000
W. H. Schrafft & Sons	425,000	10,000,000
Geo. Close Co	175,000	6,000,000
United Candy Co	125,000	5,000,000
C. A. Briggs Co	97,500	2,250,000

Methods of Manufacture.

In such a paper it is impossible to deal with formulæ for making the various kinds of confectionery and with the various methods employed by different establishments.

The most interesting piece of candy made and the one to which I have devoted most of my study is that which has been dipped into chocolate. Three methods are employed in the manufacture of this class of goods. First, fork dipped, whereby the centers are placed in the liquid chocolate and removed by means of a dipping fork. As carried on by some of the manufacturers the center is picked up by the hands and thrown into the liquid coating. Little is gained by removing the then coated piece by means of a fork for, already, if any contamination is going to take place by means of handling, it has been done in placing the piece into the chocolate, so from a sanitary viewpoint little has actually been gained. Very little of the candy consumed is made by this process and I can pass by, having barely alluded to it.

The second method is coating by hand, whereby the piece is removed from the chocolate by hands. This method possesses some marked advantages over the third, namely, machine dipping and also has some disadvantages over the same method. By means of hand dipping a more uniform coat of chocolate may be applied, which in certain pieces possessing fruits liable to ferment, may be a great advantage, for in a piece of candy developing gas when one weak spot is present in the coating, it will break through, spoiling the candy, and no doubt others in the box. This is, as one can see, very objectionable to the maker, for his consumers cannot understand the factors influencing such a happening. The next advantage and in direct line with the one first cited, is that by hand dipping a heavier chocolate may be applied, thus forming a richer coating around the piece. The third advantage, which is an advantage looked for by some people only, is that more fancy turns may be applied to a piece when hand dipped. This only adds to the expense to the consumer and in no way makes a piece of candy better to eat—the thing sought for when buying.

Handling by human hands any food

product always places that product in a dangerous place and may become infected with various disease organisms during such handling. This is one of the disadvantages of manufacturing by this method, although I do not wish to be misunderstood in saying that it is a great danger.

The third method already alluded to consists in coating the center by means of machines. Various types of machines are employed, each with the same viewpoint to be reached. Some machines possess devices that make machine made chocolates resemble very closely the hand made product. The advantages and disadvantages mentioned under hand coating apply in a reverse order to machine manufacture. One big advantage is that the time of dipping a quantity of chocolates is materially shortened by machines, which is beneficial to the consumer, in that candy so made can be sold at a much lower price than other manufactured products. By this method handling is reduced to a minimum.

All these methods have been studied with special reference to the bacteria present before and after coating. This has been done by comparing the chocolate before dipping and after dipping together with a comparison of the bacteria in the centers before dipping and after having been coated. The increase in number in a measure, represents the actual increase of bacteria due to contamination during manufacture. It is a fact that in nearly every instance machine-dipped chocolates show less bacteria than do hand-dipped ones, although the increase of bacteria in hand-dipped chocolates is by no means an appalling factor when one stops to consider the splendid chance that a piece of candy has to become infected by such an operation. Table III on page 1154 illustrates this fact.

From this it can be seen that when chocolates are made by hand methods the number of bacteria may be doubled from what originally was present, whereas when machine methods are employed little or no increase takes place.

Method of Examination.

The method employed for examining chocolate is as follows: A definite weighed amount of the chocolate, discarding the immediate surface of the sample, was placed in sterilized bottles and warm sterile water added to it, the amount of chocolate generally employed varying from 3.5 to 7 grams and often amounts with bigger limits were used. To this was added 100 cubic centimeters of warm sterile water and the mixture was shaken and re-warmed if found necessary to make a complete emulsion of the chocolate with the water. It was then plated in 1 cubic centimeter amounts in Petri dishes fitted with clay tops, either making the next dilution or plating direct as judgment showed. The plates were poured with about 5 cubic centimeters of standard nutrient agar and upon cooling were placed in the 37° incubator. The period of incubation at first employed was forty-eight hours. At the end of this time the plates were counted. Invariably the plates showed large numbers of

organisms of the spreading type which render the plate very hard to count and thus a large number of colonies were unintentionally overlooked. Later on I found that an incubation period of eighteen to twenty-four hours rendered the plate much easier to count and rather free from spreaders. It is sufficient to say here that no correlation seems to exist between 20° and 37° incubations and nothing seems to be gained by a 20° count either on agar or on gelatin. The colonies formed from the bacteria in chocolate, grown as above, are varied in size and shape and grow very rapidly, the first colonies appearing in eight to ten hours after placing in the incubator. From the same dilutions that were employed for plating, gas tubes of dextrose broth and lactose bile were made, in each case, three to five tubes being used. The gas tubes were examined both on the first and second days with the result that I found better results to be given by examination on the second day. At the end of twenty-four hours gas evolution may begin, but it is seldom completed at this time as an additional day seems to be necessary for the proper production of gas. The gas tubes employed were of the small inverted vial type in a test tube. Only a small amount of media was used in each tube. Tubes containing less than 10 per cent. of gas were not called positive and note only was made of them as being under amount. Often less than 5 per cent. of gas would be noticed in tubes and this was entirely discarded.

Table III will illustrate the results of the bacteria present in chocolate at various stages of manufacture. In the tables are also included bacterial examination of certain finished chocolate goods as made by a large chocolate manufacturing company.

The table headed "Bacteriological Examination of Chocolate" shows

TABLE III.

NUMBERS OF BACTERIA EXPRESSED PER GRAM.

		Hand-dipped.	
		Bacteria before coating.	Bacteria after coating.
Chocolate	A	768	1,020
	B	846	1,306
	C	629	1,508
	D	361	413
	E	702	2,011
Center	A	26	39
	B	18	26
	C	31	36
	D	24	53
	E	27	108

TABLE III.—*Continued.*

		Machine-dipped.	
Chocolate	A	810	881
	B	742	733
	C	613	619
	D	901	908
	E	416	396
Center	A	31	29
	B	28	30
	C	25	26
	D	27	27
	E	30	28

results of examination of various brands of chocolate all produced in the same factory. These examinations were conducted as under the chocolate investigation above, using forty-eight hour counts. Numerous examinations were made from different parts of each separate cake, samples being taken from cakes in the original packages as sealed at the manufacturing house.

Table IV illustrates that a single analysis of a cake of chocolate is insufficient to judge as to its character.

From table IV it is evident that no single analysis of chocolate taken from a cake can be said to express the number of bacteria present. Each locality shows a different number and the ratio between these is by no means a constant one, even for the same brand of chocolate. In one instance the number of bacteria present on the top part of the cake may be expressed by 40,000, in another instance by 20,000, while the bottom part of the cake in the first case, may reveal 20,000 and in the second case the number may be doubled. Thus only by a large number of examinations of chocolate from each cake is it possible to arrive at a conclusion as to the number of bacteria really present in the sample under examination.

In view of the two investigations cited in detail above it is rather hard to see where the bacteria present in chocolate really gain their entrance. After fermentation of a bean it undoubtedly contains, or has adhering to the surface, large numbers of bacteria. Upon roasting, the number is enormously reduced and as a result very few are present. The forms that are present, however, are of the spore-bearing type represented by the hay bacillus in its cultural characteristics. The presence of such large numbers of bacteria on the outer part of the cake might point toward the chance of its being an air infection and this undoubtedly is one avenue for the entrance of large numbers of bacteria to chocolate. The chocolate is cooled in pans in a room under forced ventilation and as large volumes of air are necessary for this cooling there is a great additional chance for air infection.

TABLE IV.

SOURCE OF BACTERIA IN CHOCOLATE MANUFACTURING.

Sample No.	Source of sample.	Weight in gms.	Bacteria per gm.	B. coli types.	
				dex.	lac.
1	Arribas from bag	8.0	463	—	—
2	Trinidads from bag	5.5	16,350	—	—
3	Arribas after sorting	6.5	1,030	—	—
4	Trinidads after sorting	7.0	1,286	—	—
5	Arribas after roasting	6.0	20	—	—
6	Trinidads after roasting	5.6	500	—	—
7	Trinidads, cracked	10.0	220	—	—
8	Trinidad, fine shells	10.0	18,000	—	—
9	Arribas, from fanner	10.0	7,500	—	—
10	Arribas, shells after cracking	10.0	6,000	—	—
11	Cocoa butter	5.0	110	—	—
12	Cocoa after pressing out butter	5.0	10,200	—	—
13	Breakfast cocoa liquor	5.0	1,940	—	—
14	Breakfast cocoa	5.0	2,260	—	—
15	1/5 lb. can cocoa	5.0	5,000	—	—
16	Liquor chocolate	5.0	2,280	—	—
17	1/2 lb. cake	9.0	8,333	—	—
	chocolate	13.5	4,880	—	—
18	— sweet liquor	5.0	2,750	—	—
19	Finished sweet liquor from cooling room		2,220	—	—
			9,000	—	—
			1,820	—	—
			1,500	—	—
20	— chocolate	5.0	910	—	—
21	—, cooled on trucks	8.0	540	—	—
		8.0	10,800	—	—
22	— chocolate cooled on floor	10.5	325	—	—
		7.5	1,148	—	—
23	— C. sweet chocolate cooled on floor	12.5	104	—	—
		9.5	153	—	—

Examination of Raw Materials.

The following list embraces in a general way some of the raw materials that find extensive use in the manufacture of confectionery: Sugar; glucose, both bleached and unbleached; molasses; chocolate of various grades and various blends obtained by mixing different grades of chocolate with each other and with various amounts of flavor extracts; cocoanut, both raw and dried; oils of various kinds, among which may be mentioned cocoanut oil, cocoa butter, butter itself, and in some instances by the unscrupulous dealers such inferior oils as lard, cotton

TABLE V.

SUMMARY OF RESULTS ON BACTERIOLOGICAL EXAMINATION OF CHOCOLATE.

(Bacteria expressed in numbers per gram.)

Sample.	Top of cake.	Side of cake.	Bottom of cake.	Interior, 2 inches from edge.
Maracaibo	42,000	20,000	44,000	22,000
Columbia	11,000	29,000	22,000	28,000
Eagle	16,000	5,000	44,000	44,000
Extra Premium	70,000	96,000	84,000	58,000
Pure Cocoa	10,000	18,000	20,000	15,000
Star	12,000	18,000	22,000	14,000

Sample.	Interior, 4 inches from edge.	Interior, center of cake.	Average.	Gas formers in .1 gm.	
				Dex. broth	Lac. bile
Maracaibo	36,000	4,000	26,666	absent	absent
Columbia	26,000	16,000	22,000	present	present
Eagle	12,000	58,000	22,166	present	absent
Extra Premium	56,000	82,000	74,333	present	absent
Pure Cocoa	8,000	12,000	13,800	absent	absent
Star	20,000	15,000	16,800	absent	absent

seed and soya bean; fruits of many kinds, the most important being cherries, dried, glaced and preserved, pineapple in the same general forms, apricot, dried and preserved, figs generally in the dried condition, dates dried, citron, orange and lemon peel prepared in the usual ways that these products are known to the market trade, orange as orange pulp; nuts of all kinds—peanuts, almonds, English walnuts, Brazil nuts, filberts, pecans, cashew and pistachio nuts; starch; various gums as tragacanth, arabic, agar agar, gelatin; egg albumen, dextrine, milk and cream—natural, evaporated, condensed and powdered; flavors of all kinds, only a few of which need be mentioned for nearly every conceivable flavoring desirable to the taste is used by confectioners; the most important are vanilla, lemon, orange, peppermint, wintergreen, raspberry, strawberry, maple, coffee, lime, cassia and anise.

These raw materials can be roughly divided into two classes—first, those important from the sanitary and hygienic standpoint and those unimportant from the sanitary and hygienic standpoint. By the first division I would include these raw materials that when infected naturally are detrimental to the confectionery manufacturer, as for instance cherries which are infected with yeasts.

Rate of Death of Typhoid in Chocolate.

The purpose of this work is to show the rate of dying of typhoid inoculated into chocolate made up of water, sugar, chocolate and milk powder all melted together and sterilized at a low degree of heat. In all this work the chocolate remains constant as does also the milk powder, the variables being the amount of sugar and water present. As the water was increased the sugar was decreased, and vice versa. The mixture after sterilization was inoculated with a twenty-four hour culture of B. typhosus (Hopkins) grown at 37° in standard nutrient broth. The chocolate was then molded and samples taken from the cake at various time periods.

Five-gram samples were used and determinations were made in duplicate in all cases. Dilutions of from 1:20 to 1:200,000 were employed at 100 dilution intervals. The five grams of chocolate were dissolved in 100 cubic centimeters of warm sterile water by shaking, cubic centimeters being taken from this and plated directly and also diluted. As far as possible the concentration of the chocolate and sugar was kept as low as possible and results were taken that were obtained by the lowest dilution that could be used and still have a reasonable number of colonies to the plate.

The plates were poured with standard agar immediately after plating and placed in the incubator as soon as cool. The temperature of incubation was 37° for twenty-four hours.

The chocolate when inoculated with the typhoid was stored at approximately 20°C., for the time intervals stated under each test. The percentage of water in each case was kept as close as possible to the amount at the beginning.

TEST NO. 1.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	4.0
Sugar	57.0
Chocolate	31.5
Milk powder	7.5
	100.0

	Per gram.
Initial No.	400,000
After 10 hrs.	365,000
" 20 "	320,000
" 50 "	260,000
" 72 "	205,000
" 108 "	129,000
" 168 "	76,000
" 336 "	50,000
" 772 "	39,000
" 1008 "	56,000
" 3360 "	24,000

The temperature at which this was stored was 20°C. After the end of the run the per cent. of moisture was estimated in the chocolate by drying at 100° to constant weight and was found to be 5 per cent.

TEST NO. 2.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	8.0
Sugar	53.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No.	260,000
After 10 hrs.	248,000
" 24 "	210,000
" 48 "	156,000
" 72 "	116,000
" 100 "	78,000

	Per gram.
After 200 hrs.	40,000
" 300 "	36,000
" 400 "	25,000
" 600 "	18,000
" 700 "	19,500
" 800 "	18,200
" 1000 "	15,000

The per cent. of water present at the end of the run was found to be 6.7 per cent.

TEST NO. 3.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	12.0
Sugar	49.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of typhoid	132,000
After 10 hrs.	125,000
" 24 "	60,000
" 48 "	48,200
" 72 "	33,000
" 100 "	26,000
" 120 "	24,000
" 140 "	19,000
" 160 "	16,000
" 200 "	13,000
" 250 "	13,200
" 300 "	13,100
" 350 "	13,000
" 418 "	12,500
" 500 "	11,900
" 1008 "	8,000
" 1200 "	9,000

The per cent. of water present at the end of the run was 9.6 per cent.

TEST NO. 4.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	21.0
Sugar	40.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of typhoid	180,000
After 10 hrs.	172,000
" 24 "	136,000
" 50 "	27,000
" 100 "	25,000
" 110 "	25,000
" 120 "	24,000
" 148 "	24,000
" 168 "	22,000
" 336 "	18,500
" 504 "	16,000
" 1008 "	14,000
" 1680 "	11,000
" 3360 "	10,000
" 5040 "	6,000

The per cent. of water present at the end of the run was 20.5 per cent.

At the end of each month a small amount of sterilized water was added to the chocolate sufficient to bring the percentage up to 21 per cent., and at no time during the run did the percentage fall below 19 per cent.

TEST NO. 5.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	29.0
Sugar	33.5
Chocolate	30.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of typhoid	200,000
After 10 hrs.	185,000
" 20 "	170,000
" 48 "	15,000
" 72 "	12,000
" 144 "	18,000
" 168 "	21,000
" 336 "	14,500
" 504 "	11,000
" 1008 "	8,000
" 1680 "	33,000
" 3360 "	36,000
" 5040 "	40,000
" 5200 "	26,000
" 5400 "	14,000

This determination is still in progress. The per cent. of water present at the end of 5,040 hours was 30 per cent., the percentage of water being kept up to 20 per cent. by the addition of sterile water each month. Only once was the percentage allowed to run below 25 per cent.

Rate of Death of B. Coli in Chocolate.

The purposes of this work was to show the rate of death of B. coli inoculated into chocolate of the same composition as was used for the work on B. typhosus. The mixture after sterilization was inoculated with a twenty-four hour culture of B. coli grown at 37° in standard nutrient broth 1.5. The chocolate was then molded and samples taken from the cake at various time periods.

The same precautions and dilutions as were described under typhoid were here taken, both as to plating, incubation and storage of inoculated chocolate.

TEST NO. 1.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	4.5
Sugar	57.0
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of B. coli	400,000
After 10 hrs.	375,000
" 30 "	360,000
" 48 "	350,000
" 96 "	240,000
" 168 "	100,000
" 336 "	29,000
" 772 "	168,000
" 1008 "	145,000
" 1680 "	13,000
After 3360 hrs.	25,000
" 5040 "	6,200

The per cent. of water present at the end of 5,040 hours was 5 per cent.

TEST NO. 2.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	8.0
Sugar	53.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of B. coli	200,000
After 10 hrs.	185,000
" 20 "	140,000
" 48 "	100,000
" 72 "	61,000
" 108 "	50,000
" 168 "	26,000
" 336 "	none
" 772 "	1,000
" 960 "	none

The per cent. of water present at the end of the run was 7 per cent.

TEST NO. 3.
ANAYLSIS OF CHOCOLATE.

	Per cent.
Water	12.0
Sugar	49.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of B. coli	140,000
After 10 hrs.	100,000
" 48 "	50,000
" 72 "	18,000
" 108 "	15,000
" 168 "	15,000
" 336 "	18,000
" 772 "	11,000
" 1008 "	8,000

The per cent. of water at the end of the run was 10 per cent.

TEST NO. 4.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	21.0
Sugar	40.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of B. coli	200,000
After 10 hrs.	180,000
" 24 "	90,000
" 36 "	76,000
" 72 "	14,000
" 108 "	9,000
" 168 "	11,000
" 336 "	8,000
" 1008 "	9,000
" 5040 "	none

The per cent. of water present at the end of the run was 20 per cent.

TEST NO. 5.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	28.0
Sugar	33.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of B. coli	100,000
After 10 hrs.	190,000
" 24 "	22,000
" 36 "	6,000
" 100 "	12,000
" 126 "	44,000
" 168 "	49,000
" 196 "	4,800
" 336 "	3,000
" 504 "	none

The per cent. of water present at the end of the run was 27 per cent.

Rate of Death of B. Pertussis in Chocolate.

The purpose of this work was to show the rate of death of B. pertussii inoculated into chocolate containing 8 per cent. and 21 per cent. of water, storing at room temperature for a time and taking samples at intervals as shown under experimental data.

The culture used was obtained from The American Museum of Natural History of New York City. The culture was grown at 24°C. on ascitic agar for four days. A loopful of the growth was inoculated into the chocolate, the same precautions regarding plating being here observed as described under typhoid. The plates were poured with ascitic agar and incubated at 20°C. for four to seven days, the count being taken as representing the true number present was the highest obtainable on any one of these days. In some cases I found the highest number to be visible at the end of four days, in others as many as seven days were necessary to obtain the greatest number of colonies. The results of my work on pertussis have been largely to see if a candy maker in a factory infected with the whooping cough bacillus could by any chance produce an infection in the candy which could be transmitted to children.

TEST NO. 1.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	8.0
Sugar	53.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of pertussii	80,000
After 10 hrs.	760
" 36 "	none

The work was again repeated using shorter time intervals with the following results:

	Per gram.
Initial No. present	100,000
After 1 hr.	86,000
" 3 hrs.	75,000
" 4 "	42,000
" 5 "	10,000
" 6 "	none

TEST NO. 2.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	21.0
Sugar	40.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. of pertussii	60,000
After 1 hr.	48,000
" 2 hrs.	11,000
" 3 "	none
" 4 "	none

Repetition of the above test gave the following results:

	Per gram.
Initial No. present	72,000
After 1 hr.	46,000
" 2 hrs.	20,000
" 3 "	1,000
" 4 "	none

Rate of Death of B. Tuberculi in Chocolate.

The purpose of this work was to show the rate of death of B. tuberculi inoculated into chocolate, storing at room temperature for a time and taking samples as shown under experimental data. The culture used was of the human type obtained from Dr. B. L. Arms in 1913, grown since then on egg albumen medium. At the time of beginning my work a very heavy growth of tuberculi bacilli was present on the surface and two or three loopfuls were used to inoculate into the chocolate. A suitable medium for growing cultures plated has not been found and I consider my work on this organism to be unsatisfactory. Nutrient agar, extract agar, casein agar, egg albumen agar, and ascitic agar have been tried. The best results were obtained by pouring very heavy plates of albumen agar and incubating for a period of time ranging from one to three weeks. Examination of these plates was rather indefinite and only an approximation has been reached. The colonies so developed were by no means regular in form and it was sometimes impossible to tell whether actual colonies formed from tuberculi bacilli were actually present.

TEST NO. 1.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	4.0
Sugar	57.0
Chocolate	31.0
Milk powder	8.0
	100.0

	Per gram.
Initial No. present	6,000
After 1 hr.	1,000
" 2 hrs.	none

TEST NO. 2.
ANALYSIS OF CHOCOLATE.

	Per cent.
Water	8.0
Sugar	53.5
Chocolate	31.0
Milk powder	7.5
	100.0

	Per gram.
Initial No. present	10,000
After 10 min.	8,000
" 20 "	2,000
" 60 "	6,000
" 120 "	none

A repetition of this test gave the following results:

	Per gram.
Initial No. present	8,000
After 10 min.	14,000
" 20 "	11,000
" 30 "	6,000
" 60 "	8,000
" 120 "	4,000
" 180 "	7,000
" 240 "	2,000
" 360 "	none

From the foregoing pages the following conclusions might be arrived at:

First, that the tremendous size of the candy industry warrants careful sanitary control.

Second, that hand-dipped candies run higher in bacteria than do candies coated by machines.

Third, that raw materials, especially chocolate, can be the source of a large amount of bacteria found in candy.

Fourth, that the chance of obtaining an infection of whooping cough as may be caused by B. pertussii, is very remote in chocolate candy. It was found that after a few hours there ceased to be present any trace of the organism.

Fifth, the possibility of obtaining the tubercle bacillus was very slight, although a definite time limit for its survival has not been placed.

Sixth, that even after a long period of storage, it was possible to find the typhoid organism, so the conclusion resulting is that, if typhoid carriers should by chance infect candy, the bacillus could survive a long time and might give rise to infection in an innocent participant.

Seventh, that organisms of the colon type can survive a long time and if inoculated into candy would find their way to the human body through this source.

Eighth, that the rate of death of organisms in candy is in some proportion to the amount of water that the candy has present.

It will be seen that candy with a high water content can kill organisms faster than a candy of low moisture content. This killing may be due to difference of osmotic pressure resulting between bacteria and sugar solutions. But since the organisms continue to exist for a considerable period of time (with typhoid for 5,400 hours—over 7 months), it would rather seem that this killing would be due to the aseptic properties of chocolate.

A continuation of the work mentioned above is under way.

REPORT OF THE COMMITTEE ON CITY WASTES: THE ECONOMICS OF WASTE COLLECTION AND DISPOSAL.

Dr. P. M. Hall,
Health Editor, Minneapolis Tribune, Chairman.

Read before the Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 2, 1914.

OFTEN after a city, town, or village has settled the question of the desirability of a system of waste collection and disposal, another, and a very vital question arises—that of providing the necessary funds. There are several ways in which this problem may be met. First, by letting the whole thing to a contractor and allowing him to charge each householder a certain sum, fixed by ordinance for receiving the service. Provision should be made by ordinance compelling every householder and business house to employ the service. If the work is done at all it should all be done. The authority for compulsory collection has been established by two decisions of the supreme court of the United States, one in a case brought from the courts in Detroit, and the other from San Francisco. The decisions set aside the constitutional property rights there may be in garbage for the benefit to the public health.

Another way for a city to pay for the service is out of the funds raised from general taxation. This simplifies the method of securing the necessary money to carry on the work. As mentioned before the service should extend to every citizen.

Sometimes if the funds to be raised by taxation are already large, the service is apt to be curtailed by scant appropriations. Everyone should be compelled to accept the service. You want the whole city clean, not a place here and there. If the city makes its estimates upon the budget system then it is quite certain that the amount to be raised for any system of collection and disposal will always be considered large.

This leads us to the consideration of a method of taxing for this service in much the same way as is done in some cities for the raising of money for street sprinkling. An opinion given by the city attorney of our own city has a bearing directly upon this very important subject. The attorney was asked, "Would it be possible to provide for the handling of garbage, ashes, manure, rubbish, etc., by assessment upon the property? How would such an assessment be levied? Would the funds created and arising from such assessment be separate and apart from the appropriation for current expenses?" In the efforts to keep down the expenses of the departments under Council authority it has been suggested that the money for the collection and disposal of garbage, ashes, rubbish, manure, etc., might be raised outside of the regular levy, and thereby to that extent, at least, afford relief to the

current expense fund. The section under consideration does not seem to be specific with regard to the authority to cover the expense of disposal, although it is apparently plain the authority is conveyed to assess the expense of removal, but no mention is made of "disposal," or are both comprehended in the act of "removing." He replied as follows:

"1. That the charter provision to which you refer distinctly authorizes the Council 'to require and provide for the removal throughout the city or in such districts, or on such streets thereof, as it deems proper' of any and all swill, offal, garbage, ashes, barnyard litter, manure, rubbish, yard clearings, the contents of any privy, vault, cesspool or sink, dead animals, or any other foul or unhealthy stuff or material." I venture to say, in passing, that this enumeration of offensive things, the disposal whereof is contemplated, seems broad enough to embrace noxious weeds and plants which occasion disease.

"2. The duty thus laid upon the Council is accompanied by authority to 'assess the expense of such removal upon the property from which such above named matter or things shall be taken.' Also by power to enter into five-year contracts, if that is deemed advisable, with any person who will engage to perform the service.

"3. The fund arising from such assessments would be distinct from the regular tax levy for current city expenses. Like the special assessment for street sprinkling, the proceeds would be set apart for the one purpose and could be devoted to no other.

"4. It seems to me that this power of assessment is not limited to the charging against each lot of the cost of cleansing the particular lot. The naming of districts or streets to be so cared for implies, I think, that a uniform assessment may be laid upon the area or frontage designated, thus creating a fund out of which the cost of serving the whole district shall be paid. The provision that the whole may be done by contract is inconsistent with the idea of collecting the fund by piecemeal. It is the district that is to be assessed, thus equalizing the charge. Upon that theory vacant lots, no less than such as are occupied, would share the burden. This is true of all other special assessments, the ground of the tax being that the improvement, or the service (sprinkling for example), adds to the value of the property whether occupied or not. Moreover the very condition of vacancy often invites the deposit of offensive matter which should be removed. This suggests a new method of providing money for this very necessary service. With a system of collection and disposal inaugurated the question of doing the work as cheaply as possible and deriving any revenue becomes a question of the evolution of the service."

Garbage.

The possibility of deriving revenue from the use of garbage has ever been an inviting one. The feeding of hogs, the extraction of grease, the development of steam to be utilized, all have their advocates. The sanitary features and the consideration of the public health should always outweigh

any prospect of financial return. Pig-feeding has been made profitable under certain conditions. It is doubtful if the conditions surrounding collection and final feeding are ever without some considerable nuisance. The extraction of the greases and the utilization of the resulting tankage have been considered as profitable ventures. The limitations are the conditions surrounding the can, the lack of plenty of material, and the constantly increasing amount of grease in the garbage. Disposal by fire and the utilization of the developed steam has been carried on extensively in England and to a degree in this country. It has not as yet reached its highest possibilities owing to the lack of opportunity of utilizing the developed steam for the whole 24-hour period. The limitations are governed somewhat by the character of the collected waste, the regulations of household preparation, the opportunities for complete utilization, and the ability to use auxiliary fuel and power.

Ashes.

Ashes may be used profitably for the purposes of filling low lands. Theoretically, it has been shown that there is a considerable of unburned carbon in ashes from hard coal. A number of analyses in our own city showed this to be about 30 per cent. Any value arising from this source is apt to be used in the cost of getting the separation done, in the extra cost of hauling to central points for handling, and in caring for the nuisance occasioned by the operation of sifting. In destructor plants the ashes are used as auxiliary fuel, but unfortunately for successful continuous operation, the ashes are least abundant when they are most needed as fuel to assist in burning. There have been suggestions as to the use of sifted ashes for taking the place of sand for some kinds of concrete work, but nothing practical has come of it.

Rubbish.

Buffalo, Rochester, and other cities have demonstrated that rubbish disposal can be done at profit. The reclaiming of paper, rags, bottles, rubbers, tin cans, and other rubbish has been profitably done.

Manure.

Manure is always worth more than the cost of collecting it for fertilizer. It is sold in many cities for such purposes. The method of securing collections and making the sales are different in different cities. It properly should be returned to the soil and its removal from the cities is going to be demanded in the future on account of the fly nuisance.

Street sweepings, of course, so long as they contain manure should be included in the disposal.

Night-Soil.

Night-soil should be disposed of by the municipality so long as the danger from fly infection is a real one. Attempts have been made in the past to produce fertilizer from it, but with indifferent success. By doing the collecting the city can assure odorless operations and proper disposal. The old out-door closet is rapidly disap-

pearing from our cities. Plumbing is no longer considered as a luxury but a necessity.

The economical collection and disposal of city waste demands a study of all the possibilities of utilization. If the work is assumed as a whole by the city and done well the citizens will support it, but if the service is inefficient the complaints of increased taxes are long and loud. The possibilities of complete efficient collection and disposal we have never seen realized. The demonstration is yet to be made. It is probably more closely approximated in Havana and the Canal Zone than in any other part of the world. In the Canal Zone we have been shown that the service is not expensive. There it was instituted and is carried on as a health measure, and this probably accounts for the efficiency of the service. May we not draw a conclusion from this that the service instituted for the protection of the public. health is apt to be the most efficient and the one that is supported best by the public?

AN IMPROVEMENT IN THE COMPOSITION OF LACTOSE BILE.

THOMAS W. MELIA,
New York, N. Y.

LACTOSE bile, as employed at present, has certain disadvantages:

1st: The bile is not always fresh. This is shown by too great acidity, especially in warm weather, and by the presence of considerable turbidity which will pass through the ordinary laboratory filter.

2d: The media, after sterilization, contains a heavy sediment in the fermentation tubes which interferes with the developments of the test.

3d: Many authors have criticized the inhibiting power of the bile salts upon B. coli.

In regard to the first disadvantage, it is the practice at this laboratory to purchase ox gall from freshly slaughtered animals and by special arrangement have it delivered within a few hours. It is then evaporated to dryness in a vacuum dryer. Twenty gallons of the bile are placed in shallow pans which rest upon shelves heated by steam under 15 pounds pressure. The vacuum is maintained by a Hubbard Electric Pump. The dryer is manufactured by the Buffalo Foundry Company. All bile is tested and none accepted if the acidity is more than +1.5 (Fuller's scale). Twenty gallons require about 12 hours to evaporate and yield about 15 pounds of product. This is scraped out and kept in tight containers. Once dry, ox gall keeps indefinitely. There is considerable saving by evaporation, since loss of breakage of bottles in sterilizing the liquid bile has been quite material. Breakage in transportation to branch laboratories is also avoided. In many cases fresh ox gall is not available to laboratories situated in small towns. Again, by purchasing bile only in the winter and evaporating to dryness we avoid the spoiled article frequently obtained in summer.

The cost of evaporating, including bile, labor and fuel is about $1.50 per pound. One pound of bile is sufficient for four and eight-tenths liters of media (10 per cent. bile), or thirty-three samples of water tested in .1 cc., 1.0 cc. and 10 cc. quantities.

Ordinary commercial brands of bile salts cannot be used in lactose bile media with success, but there is now available desiccated bile of the right quality which may be purchased from William F. Kipp, 69 Barclay Street, New York City.

In regard to the sediment present in the fresh bile and in the sterilized media it was thought that old bile might be furnished in some instances, possibly with some added substance for preservation. Examination of the sediment proved it to be composed of mucin, lime salts and broken gallstones (cholesterine) chiefly, probably formed by streptococcus growth. The bile should be settled and only the clear supernatant liquid used. The

following table No 1 gives the specific gravity and salt content of several deliveries.

The excessive salt present on February 10, 1914, was probably due to careless handling at the slaughterhouse, as salt water is used for flushing purposes. The salt was probably not

The results show quicker gas formation, the production of a larger amount of gas, in higher dilutions, and less interference from streptococcus in the 5 per cent. bile than in the 10 per cent. bile.

Streptococcus produces a heavier growth and more acidity in 10 per

TABLE 1.

1913.	Specific gravity.	Na Cl. ppm.	1914.	Specific gravity.	Na Cl. ppm.
Oct. 7	1.030	10,700	Jan. 6	1.029	10,540
" 14	1.029	10,520	" 13	1.033	11,020
" 21	1.037	10,810	" 20	1.037	10,910
" 28	1.028	9,960	" 27	1.040	11,070
Nov. 12	1.020	9,430	Feb. 3	1.032	10,310
" 18	1.032	10,210	" 10	1.078	288,000
" 24	1.040	11,060	" 17	1.028	10,010
Dec. 9	1.030	10,692	" 24	1.030	10,682
" 16	1.028	9,950	Mar. 3	1.026	10,050
" 23	1.022	9,510	" 10	1.042	12,270

added intentionally since it does not act, even in saturated solution, to kill B. coli or B. typhi. (Sternberg, Bacteriology, page 195.)

In regard to the second disadvantage, the sediment in the fermentation tubes may be prevented by making a 5 per cent. instead of a 10 per cent. bile media. The efficiency of the media will be next discussed.

The known inhibiting power of bile salts led to an investigation of the best strength of bile media to employ. Comparison of 5 and 10 per cent. bile media (1 per cent. lactose and 1 per cent. peptone each) on B. coli pure culture, contaminated water, street washings, milk, sewage, human and horse feces is given in Table 2.

cent. bile than in 5 per cent. The acidity is stronger also in the bulb than in the arm of the fermentation tubes. The precipitate interferes with the development of the bacteria and the gas formation.

Tests were also made to determine the most efficient percentage of bile. Results with 1 per cent., 2 per cent., $2\frac{1}{2}$ per cent. and 3 per cent. dried ox gall are given in Table 3.

As the amount of lactose and peptone (food materials) was alike, the differences must be due to some physiological function of the ox gall. The increase in amount of gas produced in 24 hours, as the amount of bile increases, is very striking. It is also apparent in the 48-hour and 72-hour results. Posi-

TABLE 2.

COMPARISON OF RESULTS OBTAINED BY FIVE PER CENT. AND TEN PER CENT. BILE MEDIA UPON HIGHLY CONTAMINATED SAMPLES.

	Time recording gas. Hours.	Five per cent. bile media. Amount of gas produced in different dilutions.							Time recording gas. Hours.	Ten per cent. bile media. Amount of gas produced in different dilutions.							Positive isolation from high dilutions of B. coli.
		cc. 1.0	" 0.1	" .01	" .001	" .0001	" .00001	" .000001		cc. 1.0	" 0.1	" .01	" .001	" .0001	" .00001	" .000001	
Sol. No. 1. B. coli culture from water. 100,000 per cc.	24	30	37	29	26	30	35	0	24	26	20	17	32	20	31	0	+
	48	50	59	48	56	63	70	0	48	37	35	41	48	52	54	0	+
	72	72	67	70	83	63	72	0	72	60	56	48	51	50	58	0	+
Sol. No. 2. Contaminated pond, L. I.	24	42	37	29	40	0	0	0	24	12	22	46	14	0	0	0	+
	48	56	58	70	54	0	0	0	48	46	33	51	29	0	0	0	+
	72	70	69	72	78	0	0	0	72	59	68	72	36	0	0	0	+
Sol. No. 3. Street washings after rain-storm.	24	47	49	53	46	54	52	0	24	12	10	17	23	50	0	0	+
	48	56	70	64	68	64	76	0	48	32	17	28	37	57	0	0	+
	72	61	78	82	69	70	79	0	72	49	67	54	93	72	0	0	+
Sol. No. 4. Contaminated milk from ice cream.	24	14	32	28	16	41	36	54	24	16	28	37	31	30	0	0	+
	48	29	37	31	29	48	42	63	48	29	36	91	46	37	26	0	+
	72	39	93	46	37	48	50	67	72	87	54	91	59	54	41	0	+
Sol. No. 5. Sewage from Queens, L. I.	24	47	51	56	58	71	70	0	24	50	74	32	60	42	37	0	+
	48	82	74	63	68	75	76	0	48	86	82	80	92	48	55	0	+
	72	82	86	72	70	75	78	0	72	86	82	91	92	90	67	0	+
Sol. No. 6. Human feces.	24	60	50	42	37	60	60	70	24	48	50	29	38	46	45	61	+
	48	78	91	86	86	80	78	78	48	63	57	52	53	91	70	66	+
	72	79	90	87	86	83	79	78	72	74	89	85	82	91	78	70	+
Sol. No. 7. Horse feces.	24	22	28	24	26	27	0	0	24	12	8	7	10	6	0	0	+
	48	42	43	51	47	49	16	0	48	33	22	19	31	17	0	0	+
	72	46	44	51	48	49	31	0	72	34	37	29	37	62	0	0	+

tive tests in higher dilutions were also shown with the larger amounts of bile. The results are probably due to prevention of over growths and interfering growths. For example, streptococcus was found in less high dilution with the larger amount of bile. It is interesting to note that B. coli was actually isolated in .00001 cc. although gas was not produced in the 1 per cent. and 2 per cent. media.

Table 4 gives a similar comparison with a mixture of human and horse feces. The results are of the same order. As horse feces contain an abundance of streptococci, the lack of interference is shown with the higher amounts of bile.

It is not advisable to use less than 5 per cent. bile owing to the effect of dilution when planting 10 cc. quantities of water.

TABLE 3.

COMPARISON OF RESULTS OBTAINED BY ONE, TWO, TWO AND ONE-HALF AND THREE PER CENT. BILE MEDIA UPON SEWAGE.

	Time recording gas. Hours.	One per cent. bile media. Amount of gas produced in different dilutions.								Time recording gas. Hours.	Two per cent. bile media. Amount of gas produced in different dilutions.								Tubes showing 20 per cent. or over on gas formation.	
		10.0 cc.	1.0 "	0.1 "	.01 "	.001 "	.0001 "	.00001 "	.000001 "		10.0 cc.	1.0 "	0.1 "	.01 "	.001 "	.0001 "	.00001 "	.000001 "	1%	2%
Sol. No. 1. Sewage	24	8	6	8	7	4	5	0	0	24	10	12	14	10	10	17	0	0	0	0
from L. I.	48	12	19	10	12	7	9	0	0	48	30	37	30	28	28	26	0	0	0	6
	72	20	20	18	22	28	20	0	0	72	37	41	36	28	30	42	0	0	5	6
Isolation of B. coli		+	+	+	+	+	+	+	0		+	+	+	+	+	+	+	0		
Isolation of Strep.		+	+	+	+	+	+	0	0		+	+	+	+	+	+	0	0		

		Two and one-half per cent. bile media. Amount of gas produced in different dilutions.									Three per cent. bile media. Amount of gas produced in different dilutions.									
		10.0 cc.	1.0 "	0.1 "	.01 "	.001 "	.0001 "	.00001 "	.000001 "		10.0 cc.	1.0 "	0.1 "	.01 "	.001 "	.0001 "	.00001 "	.000001 "	$2\frac{1}{2}$%	3%
Sol. No. 1. Sewage	24	14	16	10	20	17	27	20	0	24	27	30	33	37	40	36	27	0	3	7
from L. I.	48	36	37	41	59	42	36	39	0	48	46	54	56	53	46	48	42	0	7	7
	72	50	49	53	47	46	51	46	0	72	85	82	77	76	54	79	59	0	7	7
Isolation of B. coli		+	+	+	+	+	+	+	0		+	+	+	+	+	+	+	0		
Isolation of Strep.		+	+	+	+	+	0	0	0		+	+	+	+	+	0	0	0		

As the previous comparisons were made on highly contaminated samples, a series of tests were made comparing the 5 and the 10 per cent. dried ox gall solution on the regular routine water samples from various supplies of the Manhattan and Brooklyn watersheds, and the results are given in Table 5.

Some of these waters are from underground supplies and some from surface ponds, which show the presence of contamination, especially after heavy rain storms, due to their shallowness.

It is apparent that the 5 per cent. solution is much more sensitive and gives higher percentages of B. coli present, as can be seen in Table 5. This is

especially true if the B. coli is in the attenuated state.

Examination of the individual analyses (45 in number) showed that the 5 per cent. media gave a positive test for B. coli one dilution higher than the 10 per cent. media twelve times in the one-day results whereas this occurred only once with the 10 per cent. media. In the two-day results the 5 per cent. media was one dilution higher fifteen times and two dilutions higher six times. The 10 per cent. media was one dilution higher only once. In the three-day results the 5 per cent. media was one dilution higher fifteen times

TABLE 4.

COMPARISON OF RESULTS OBTAINED BY ONE, TWO, TWO AND ONE-HALF AND THREE PER CENT. BILE MEDIA ON A MIXTURE OF HUMAN AND HORSE FECES.

	Time recording gas. Hours.	One per cent. bile media. Amount of gas produced in different dilutions.								Time recording gas. Hours	Two per cent. bile media. Amount of gas produced in different dilutions.								Tubes showing 20 per cent. or over on gas formation.	
		10.0 cc.	1.0 "	0.1 "	.01 "	.001 "	.0001 "	.00001 "	.000001 "		10.0 cc.	1.0 "	0.1 "	.01 "	.001 "	.0001 "	.00001 "	.000001 "	1%	2%
Sol. No. 2. Mixture	24	9	7	12	10	8	5	4	0	24	10	14	17	12	10	18	16	20	0	1
of human and horse	48	10	19	16	21	12	14	26	0	48	12	22	18	27	16	31	22	29	2	5
feces.	72	19	36	20	22	17	16	30	0	72	12	22	19	30	16	32	26	40	4	5
Isolation of B. coli		+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+		
Isolation of Strep.		+	+	+	+	+	+	+	0		+	+	+	+	+	+	+	0		

		Two and one-half per cent.. bile media. Amount of gas produced in different dilutions.									Three per cent. bile media. Amount of gas produced in different dilutions.									
		10.0 cc.	1.0 "	0.1 "	.01 "	.001 "	.0001 "	.00001 "	.000001 "		10.0 cc.	1.0 "	0.1 "	.01 "	.001 "	.0001 "	.00001 "	.000001 "	2½%	3%
Sol. No. 2. Mixture	24	30	23	27	30	14	17	29	29	24	20	26	30	41	16	15	22	30	6	6
of human and horse	48	36	30	37	36	19	28	39	41	48	36	46	49	47	27	29	51	58	7	8
feces.	72	60	48	41	42	30	40	60	72	72	72	74	69	73	39	41	56	70	8	8
Isolation of B. coli		+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+		
Isolation of Strep.		+	+	+	+	+	+	+	0		+	+	+	+	+	+	+	0		

TABLE 5.

COMPARISON OF FIVE AND TEN PER CENT. BILE MEDIA ON DRINKING WATER SUPPLIES.

	Five per cent. dried ox-gall.			Ten per cent. dried ox-gall.		
	0.1 cc.	1.0 cc.	10 cc.	0.1 cc.	1.0 cc.	10 cc.
24 hrs.	2%	22%	50%	2%	16%	31%
48 "	13 "	31 "	75 "	7 "	18 "	40 "
72 "	15 "	49 "	82 "	9 "	27 "	51 "

and two dilutions higher five times. The 10 per cent. media was one dilution higher only once.

The three-day results with 5 per cent. media proved the presence of B. coli in higher dilution than the two-day results in 22 per cent. of the samples, so that it is preferable to retain the requirement of three days in the test.

Anomalies, failure to produce a positive test in the larger quantities of water tested, although obtained in smaller quantities of the same sample, were infrequent. Three were obtained with 10 per cent. media and none with 5 per cent. media.

Gas production of 5 per cent. to 10 per cent. inclusive, which did not reach a test in three days, occurred nine times with the 10 per cent. media and only five times with the 5 per cent. media.

In testing specifically for B. typhi in water at this laboratory, 100 cc. volumes are added to 500 cc. of peptone bile (without lactose) in glass stoppered bottles and incubated over night at 37½°C. We have found it advantageous in typhoid isolation to omit lactose in order to practically eliminate the formation of acidity which interferes with the development of B. typhi and produces a change of character in B. coli which later interferes with the separation of B. typhi. We have proven this by inoculating B. coli, B. typhi and streptococcus longus into lactose peptone bile (10 per cent.) and peptone bile (5 per cent.) and then isolating the B. typhi on successive days. With peptone bile (5 per cent.), B. typhi could be obtained for four days and longer. With lactose peptone bile (10 per cent.) after twenty-four to thirty-six hours the character of B. coli was frequently changed in that it lost its acidifying property.

This fact probably explains the failure in many cases to confirm the presence of B. coli upon litmus lactose agar when a presumptive test has been obtained, by those who do not rely upon the presumptive test alone. These modified forms of B. coli produce transparent non-acidifying colonies on Conradi-Drigalski media interfering greatly with the chance of obtaining B. typhi. That the character of B. coli was actually changed was shown by

rejuvenation in liver broth and the regaining of the lost functions.

The 10 per cent. media containing lactose also acquires such a heavy sediment that it interferes. This is avoided in 5 per cent. media without lactose due to both the omission of lactose and the reduction in amount of bile. In testing for B. typhi, 1 cc. is withdrawn from the bottom of the bottles and the sediment interferes with the development of colonies upon transferring direct to large Petri dishes (8″ diam.), containing Hesse agar or Conradi-Drigalski agar.

Peptone bile media is now used with great success in many hospitals for the isolation of B. typhi from stools and blood direct.

Summary.

Lactose bile containing 5 per cent. dried ox-gall is preferable to 10 per cent. media.

The formation of gas is more rapid and greater in amount. Positive tests appear in higher dilutions. Attenuated B. coli is more readily shown.

Interference by other bacteria is less in evidence, especially by streptococci.

It is especially more advantageous with sewage and badly polluted waters, but is also more delicate with the ordinary quality of drinking waters.

For the same reasons, 5 per cent. of dried ox-gall appears preferable to smaller amounts of bile in the media.

It is just as useful if not more so in the isolation of B. typhi. In this use the lactose is best omitted. The lack of formation of acidity and of sediment is advantageous. Furthermore, B. typhi may be isolated after longer incubation. In the presence of lactose, B. coli is changed in character frequently and becomes non-acidifying, this interfering with the identification of B. typhi.

The 5 per cent. bile makes a clearer media without interference from sediment. In sterilization, foaming is less apt to occur and cotton plugs are not forced out from the tubes. The fermentation tubes are more easily cleaned, hence there is less breakage and a saving in time.

A large reduction in cost of media, nearly 50 per cent., is important.

The writer is indebted to Dr. Frank E. Hale, director of laboratories, in preparation of this paper, also Mr. T. Muer, bacteriologist, for numerous determinations made at the Mt. Prospect laboratory.

A NOTE ON THE TESTING OF DISINFECTANTS.

Samuel Rideal, *London* and J. T. Ainslie Walker, *New York*.

Supplementary to an article published in the American Journal of Public Health, Vol. III, No. 6 (June, 1913), page 575.

IN VIEW of the fact that the International Committee on The Standardization of Disinfectants, appointed at the last meeting of the International Congress on Applied Chemistry, cannot meet this year, owing to the war, and that this may entail a further delay of three years, we desire to call attention to one or two points which have arisen since the publication of our paper on "Approved Technique of The Rideal-Walker Test," * and to submit the following suggestions as addenda to the paper referred to.

First, in view of the difficulty experienced by some workers not familiar with the technique of the chemical laboratory, we suggest that a burette, such as that described by Hermann W. Mahr, of the Board of Estimate and Apportionment, New York, can be adopted in place of the dropping pipette. On the other hand, we know many workers who have a decided preference for the dropping pipette originally used by ourselves and who do not see the necessity for changing this detail of the technique.

The second suggestion deals with the well-known variations in resistance offered by the standard broth culture of B. typhosus. To obtain the desired result in the phenol column—life in $2\frac{1}{2}$ minutes and in 5 minutes, and no life thereafter—dilutions ranging anywhere between 1 in 80 and 1 in 140 may be required. We feel that this range is too great, and suggest, therefore, that the culture be rejected if it calls for a phenol dilution higher than 1 in 110, or lower than 1 in 190. Where the culture becomes so attenuated as to call for dilutions higher than 1 in 110, it can be strengthened by passage through any suitable animal. By restricting this range in dilution, the only rational objection to the Rideal-Walker Test is at once removed.

A new difficulty has been introduced through the war; it is impossible now to obtain supplies of Witte's Standard Peptone. We understand this matter has been taken up by an American committee, representing four prominent laboratories, with Doctor Conn as umpire, and that this committee is about to report in favor of a brand which is said to be equal to Witte's in every respect. In the meantime, it would be interesting to have the views of other workers. We, therefore, invite discussion on this point.

(Sgd.) Samuel Rideal,
August 10, 1915.

(Sgd.) J. T. Ainslie Walker,
August 23, 1915.

* American Journal of Public Health, Vol. 3, No. 6; *New York Medical Journal*, March 7, 1914.



WILLIAM C. GORGAS, M. D., D.SC., LL.D.



*GEORGE M. STERNBERG, M. D., LL. D.



STEPHEN SMITH, M. D., LL. D.



HENRY D. HOLTON, A. M., M. D.



FREDERICK MONTIZAMBERT, M. D.

The Distinguished Sanitarians who were honored with election to Honorary Membership in the American Public Health Association at the Rochester Meeting, Sept. 1915.

*The Association regrets to announce the death of General Sternberg on November 3rd, 1915.

DR. CARLOS G. FINLAY.

William C. Gorgas, M. D.,
Surgeon-General U. S. Army.

Address delivered at the Forty-third Annual Meeting of the American Public Health Association, at Rochester N. Y., September 7, 1915.

I MAKE no apology for confining my remarks tonight to the life and character of Dr. Carlos G. Finlay of Havana, President of this Association in 1905.

No country owes a greater debt of gratitude to Doctor Finlay than does the United States. Doctor Finlay was the first explorer in the field of research relating to the transmission of yellow fever which afterwards culminated in the demonstrations of Reed, Carroll, Lazear and Agramonte, and has since been demonstrated by the eradication of yellow fever from Cuba and Panama. New York City would not now be the metropolis it is if yellow fever were now prevailing there as it did during the latter half of the eighteenth century and the first half of the nineteenth century. The United States would have lost thousands of its citizens and hundreds of millions in wealth during the past twenty years if Havana had continued as a focus of yellow fever.

It was Doctor Finlay's brilliant and logical reasoning that first suggested that the stegomyia mosquito was the transmitter from man to man of yellow fever.

Doctor Finlay was born in the city of Puerto Prince de Cuba, on December 3, 1833. His father was Scotch and his mother French. His father was a physician, at this time practising his profession in that city. Young Finlay was given an excellent general education, having had the advantage of schooling in Cuba and in Europe. He took his medical degree in 1855 at the Jefferson Medical College, Philadelphia. Most of his long professional life was spent in Havana, Cuba, specializing on diseases of the eye. At the session of the International Sanitary Conference, to which he was a delegate, held in Washington in 1881, he first made public his views concerning the transmission of yellow fever. From that time on he was constantly writing and publishing theses upon this subject. When the Spanish-American War broke out he offered his services to the United States and served through the Santiago campaign as an acting assistant surgeon in the U. S. Army. Though he was then sixty-five years old he went to the front with the troops and suffered without complaint the very unusual hardships of the Santiago expedition. His services at Santiago were of great value, due to his unusual knowledge of yellow fever. He afterward served with us in the Sanitary Department of the city of Havana. When the American occupation ended in 1902, Doctor Finlay succeeded me as Chief Sanitary Officer of the city. In 1908 he was retired from this position with a liberal pension. He died August 20, 1915. Doc-

tor Finlay was one of the fortunate men who lived long enough to see his work generally recognized and he has just died, honored and revered by all the scientific world for the important part which he played in the discovery of the method of the transmission of yellow fever. He was the recipient of the Mary Kingsley medal, was made an officer of the Legion of Honor by the French government, and was awarded many other honors.

I had the honor and pleasure of knowing Doctor Finlay well. We were closely associated for four years in our Cuban work. We were both members of a board whose duty it was to see every case thought to be yellow fever in the city of Havana. This duty brought us together nearly every day. I formed the very highest opinion of Doctor Finlay's scientific ability. His personal character impressed me so that I can look back through life and see few persons for whom I formed a greater affection.

He was a most genial, kindly, modest man, but strong and determined when he thought any matter of principle was involved.

Of the workers in this great discovery, who were collected in Havana fifteen years ago, Finlay, Carter, Reed, Carroll, Lazear, and Agramonte, Carter and Agramonte alone remain. I like to picture the meeting that has taken place between two such great spirits as Finlay and Reed. I would say: "Requiescat in pace," except that I know such souls do not desire to rest in peace but are continuing development along the altruistic lines which they so preëminently adorned in this life.

Health Department Reports and Notes.

REPORTS.

Seattle, Washington.

In the Report of the Department of Health and Sanitation of Seattle for the calendar years 1912, 1913, and 1914 is presented an impressive account of the work which has been accomplished by the Department under the Commissionership of Dr. J. S. McBride. The Commissioner finds a further decrease in the general death-rate over the previously low figures, the crude rate being for the three years 8.15, 8.37, and 8.10 respectively. "The statistics for the year 1914," remarks the Commissioner, "show Seattle to have the lowest death-rate in the existence of the city and therefore it is more than probable that Seattle enjoys the lowest death-rate of any city of equal size in the world, the position she has occupied since the Census of 1910." Conspicuous decreases are noted in tuberculosis, in communicable diseases of childhood, and in diarrhea and enteritis under two years of age. Deaths are tabulated according to the International Classification, though by months instead of the usual arrangement under age-groups. The communicable disease work has been furthered by the completion of a new isolation hospital.

Under the head of typhoid fever it is remarked that, while fully 60 per cent. of the cases come from outside the city, the dangers in this disease should be decreased through extension of water and sewer mains in certain districts. The water "has been closely guarded during the year by two inspectors and one physician constantly on duty. We have insisted on Widal tests and typhoid inoculation of everyone going into the water-shed and, although many men were employed there during the year, not a single case of typhoid fever was discovered."

The tuberculosis division was very active and presents an interesting report. A child welfare division has been organized, one of its first activities being the investigation and licensing of infant boarding.

More than half of the maintenance budget of the Health Department was required for garbage collection and disposal. The method used is that of "sanitary fills," on city property with few exceptions. The Commissioner gives as his finding, based upon laboratory and other investigations, that he has as yet "failed to find any valid reasons for discontinuing the present method, from a health standpoint."

Milk inspections and analyses are reviewed and a plea is made for a new ordinance covering pasteurization, bovine tuberculosis, etc. The city is supplied by 11,000 cows on 1,275 dairies, indicating a very considerable problem, and under present conditions it is creditable that the percentage of milk samples above the state bacterial standard of 200,000 was not higher than 13 per cent.

A clear graphic representation of the organization of the Department is given, showing Divisions of Tuberculosis Control and Medical Inspection, Sanitation, Emergency Hospital, Garbage, and Clerk and Vital Statistics.

The report is well printed and the matter most attractively presented. For convenience of reference of a table of contents, with pagination, might well be added.

Long Branch, New Jersey.

Refreshment and a sense of admiration for good work well reported are the sentiments produced by the reading of the First Annual Report of the City of Long Branch, N. J., for 1914. The report is a clear, concise, interesting record of valuable constructive work which marks the beginning of modern health control in this community. Both in form and in substance, it may be considered on the whole a very worthy approach to the model for its class —an excellence all the more praiseworthy in a first report.

With a permanent population of some 15,000, Long Branch may be put down as a member of the numerous genus of small cities, with the exception that, being a seaside resort, it receives during the summer months a large temporary increment of population which brings certain peculiar sanitary problems—as, for example in connection with the swelling of milk supplies. Thus the maximum population is estimated as high as 60,000 for a short time, while an average of 20,000 for the whole year is a fair assumption.

Many activities pursued by modern health authorities are, it is true, merely touched upon in the report of the Health Officer, Mr. John Hall, but the aim has been at the beginning "to do a few things well rather than to attempt too much." Hence the report deals in the main with the work done in suppressing communicable disease and in improving the milk supply.

The first step in the improved order was the appointment of a competent health officer, licensed by the state. It is of interest to note the substantial part played by public-spirited and generous citizens in putting the better health organization on its feet. The salary of the health officer for three months, until the beginning of a new year, was paid out of a fund raised privately by a group of citizens known as the "Clean Milk Committee." From this same fund also was equipped a laboratory for milk analysis, and a motorcycle provided, which were subsequently turned over to the Board.

The sanitary status of the city as shown by vital statistics is given its due position of importance, with explanatory comment on the figures. Regarding population a peculiar difficulty, already alluded to, is met with—viz., the large temporary summer population. The estimated average for the year, as the health officer points out, is by no means exact, but a fairly accurate basis for death-rates is reached by excluding the deaths of non-residents brought for treatment in the local hospital and basing the rates on the census estimates for permanent population. By this method a general death-rate of 15.1 per thousand is obtained.

The recording of cases of communicable disease has, under the new régime, been put on a systematic basis by means of history cards and a spot map, and reporting has been much improved. The institution of microscopic work in the health department laboratory has been a decided step in advance. The tests for diphtheria and other diseases are made by the State Health Department, but the saving in expense of mailing specimens and of time in waiting for reports makes it very desirable, says the health officer, to have the work done locally.

Excellent work is recorded in improvement of the milk supply, the important measure of a graded classification based on pasteurization and the tuberculin-test having been adopted. Eighty to 95 per cent. of the milk is pasteurized, while all raw milk is from tuberculin-tested cows. This Board is fortunate in having only seven to nine dealers to reckon with, though many of the dairies are so far distant that the extensive coöperation of the State Dairy Division had to be obtained.

Private water supplies were examined, inspected and analyzed, and 34 out of 46 wells were found to be polluted and were ordered closed. The health officer comments quite justly on the danger of such sources of supply in communities having wells and privies, and indicates the abolition of both as an important future line of work.

A number of other lines of inspection work are reported and an account given of the enforcement of regulations for barber shops. Considerable publicity work, such as is particularly useful in the outset of a sanitary campaign, was carried on, articles in the local press taking the first place. The text of four excellent milk publicity charts is reproduced. In conjunction with the neighboring community of Asbury Park a public meeting in the interest of improved milk supplies was held and given considerable publicity. The report closes with summaries of new ordinances and of prosecutions. A convenient table of contents (which might better appear in the front of the report) is appended.

In the general excellent and pleasing effect of this report one is apt to overlook deficiencies. These, such as have been noted above, lie in omissions which will no doubt naturally be supplied in future reports from this source.

Ottawa, Ontario.

The Annual Report of the Ottawa Health Department for 1914 presents the record of much creditable work, though the fact that most of the matter appears in eight separate reports of staff officials makes a summary view somewhat difficult—a disadvantage which might be remedied by a brief general survey, of salient points, in the report of the Medical Officer of Health.

The estimated population is given as 101,795, though the mode of estimation is not mentioned, and the total deaths as 1,868, which, by deduction of 206 non-resident deaths, gives a rate of 15.26 per thousand. The specific death-rates for the various communicable diseases and for infant mortality do not appear.

Deaths are classified by cause apparently according to the International Classification, which is now becoming, as it should be, general in health reports, but it would be desirable to have the table so headed and the numerical designations of the causes given.

Under the head of diphtheria, which for three years has shown a high prevaleuce, the following noteworthy comment appears: "This is a most regrettable condition of affairs, where we know that practically all of these cases died owing to delay in calling for treatment. It cannot be too strongly impressed on the people that all cases of sore throats and croupy conditions should be seen by a physician without delay, both for themselves and the general public. Many cases are but slightly ill and yet if untreated are capable of carrying the disease in a most malignant form to others. This is especially true of the form affecting the nose, in which a discharge from the nose may be the only sign noticed. People should not delay in calling in a physician at once, and if they are unable to meet the expense, the Health Department should be notified and a physician will see the patient." The Isolation Hospital report shows, in confirmation of the above, that, out of 51 deaths from diphtheria, 27 of the patients died within 48 hours after admittance. The occurrence of five cases of scarlet fever and seven of diphtheria among the hospital staff (two cases of internes and ten of nurses) is remarked.

Dairies are scored but once a year, a frequency which may indicate conditions but can hardly result in much improvement in those numerous cases where repeated re-inspections and advice are necessary. Data as to scores are not given. Two thousand and twelve samples of raw milk showed an average bacteria count of 259,000; 202 samples of pasteurized milk, 31,000; 202 of "nursery" milk, 28,000. Individual figures for the dealers are not, however, given.

An epidemic of typhoid fever occurred in October, 1914, in which month 59 city cases out of the year's total of 119 cases were reported. This is attributed by Mr. Joseph Race, the bacteriologist, to fly infection. "Protection against flies was relaxed too early owing to several cold days during the early part of the month, with the result that there was no protection during the period following summer prevalence and when the climatic conditions drove the flies to the warm houses." This scanty evidence is far from convincing, and the possibility of milk infection is not mentioned.

The report would be improved by the addition of financial statistics and some statement of prosecutions conducted. A list of the Board and staff and a table of contents are also missing features.

In the absence of Medical Officer of Health, Dr. T. A. Lomer, on account of the European war, the report is presented by Dr. R. Law, Acting M. O. H.

Calgary, Alberta.

This Report, for 1914, is a showing of excellent progress during the year in tuberculosis control, infant hygiene work, sanitation of milk supplies, housing and municipal cleanliness, and increased coöperation on the part of the public. "A constructive policy aiming at the 'prevention' rather than 'control and cure' of disease" adopted by the Department of Health at its reorganization two years ago is evidently producing results. Few important criticisms suggest themselves in connection with any section save that on vital statistics. The Medical Officer of Health, Dr. C. S. Mahood, here labors under the disadvantage that registration of

vital records is not under the control of the Board of Health. There is, however, a clear statement of deaths and a number of figures of importance are given. The deficiency lies in the failure to give any statement of population or of death-rates for chief and communicable causes. The only rates given are those for general death-rate, 8.8 (a marked decrease over the preceding year), and infant mortality, 123.6 deaths under one year per thousand births. Inasmuch as the medical health officer claims "the lowest death-rate for the city for a good many years and the lowest death-rate of any city in Canada, and with but two exceptions, the lowest death-rate of any city of its size and over on the continent," the absence of the population basis for that rate is all the more conspicuous.

There was a marked decrease in the intestinal diseases of infants, "due to the splendid work of the Child Welfare nurse, the proper supervision of the milk supply and the operation of the Pure Milk Depot for bottle-fed babies." Remarkable diminutions in deaths due to pneumonia from 80 in 1913 to 48 in 1914, and in broncho-pneumonia from 22 to 4, is ascribed to "the war waged in the overcrowded districts and the educational campaign insisting on proper ventilation in apartments, homes, and theatres, etc."

Marked progress was made in the improvement of milk supplies, but a total of 220 bacteriological milk samples, limited to three months in early spring, does not indicate an adequate degree of supervision in this direction. The statement that milk tests have been performed every month is not borne out by the report of the Milk and Dairy Inspector.

Inspections of meats and other foods are detailed in full, and it is evident that excellent work has been done in this department. The Chief Sanitary Inspector reports that a very successful "Clean-up Week" was held, and that the coöperation of the public has been gained to such an extent that the number of prosecutions in his Department was reduced from 229 in 1913 to 78 in 1914. Statistics are given on the collection and disposal of refuse, which is managed by the Health Department. The cost of collecting garbage was 63.27 cents per cubic yard; for ashes the cost was 40.77 cents. The refuse was destroyed by incineration at a cost of 27.35 cents per cubic yard.

Altogether the report is clear and readable, but would be improved by the addition of a financial statement and a page showing staff and organization.

NOTES.

Birmingham (Ala.) Broke!—The city of Birmingham, Alabama (population 150,000), has discontinued its street sprinkling and garbage collection, dispensed with its health officer, city physician and milk inspector, abolished its recreation department with play-grounds and indoor gymnasium and has cut off every cent of its appropriations to hospitals, children's homes and all charities! These are but a few of the wholesale measures for cutting down expenses adopted by the City Fathers when they recently found that the city was spending about $1,000 a day more than it had to spend.

Since the power of regulation of taxes is delegated by the state constitution to the legislature—a body which meets once in four years, the city decided that at present the best thing to do was to have only as much government as it could pay for—and is now having it.

This experiment in enforced retrogression will be interesting to watch from a public health standpoint.

*

Get That Measle!—The New York City Health Department is making an effort this year to supervise better the return of convalescent measles victims to the city schools. Each physician reporting a case of measles receives copies of the two following blanks:

Department of Health, City of New York.

Borough of....., 19

Your report to the Department of Health that.....

.....is ill with measles and under your professional care, is hereby acknowledged. The patient should be kept away from others.

Children and teachers with measles are excluded from school. They are permitted to return five days after appearance of rash, provided all catarrhal discharges and rash have disappeared.

Others in the family who have had measles may continue at school.

Those who have not had measles are excluded from school until fourteen days after date of last exposure.

EUGENE W. SCHEFFER,
Secretary.

IMPORTANT: The teacher or child receiving this certificate will present same at the school.

This is to certify that on.....I examined of who has had measles since....., 191....., and that he—she may return to school.

.....M. D.
Attending Physician.

Blank certificates for the others exposed will be furnished on request.

BUREAU OF PREVENTABLE DISEASES.

The physician is thus placed in full charge of the return of the pupil or teacher to school.

*

Fumigation Discontinued.—Fumigation as a means of terminal disinfection was condemned and abandoned in the city of Milwaukee last June and operating now on the assumption that "fumigation is of no particular value" and "a waste of money," the health department is endeavoring to secure the wider application of isolation, bed-side disinfection, scrupulous cleanliness via the soap and water method, thorough boiling of bed linen, exposure of all clothing, etc., to sunlight, and similar measures for constant and thorough cleanliness.

*

Minnesota Bulletins on Rural Sanitation.—Mr. H. A. Whittaker, Director of the Division of Sanitation of the Minnesota Department of Health, has prepared and issued two very interesting and useful bulletins dealing with sanitation in rural communities. The one is entitled, "Farm Water Supplies" and the other, "Sewage Disposal in Unsewered Districts."

The foreword of the bulletin on water supplies states that it was originally prepared for the purpose of advising farmers as to the proper method of obtaining a safe water supply from a sanitary point of view. It was later endorsed by the State Department of Education in relation to water supplies for rural schools. In this bulletin Mr. Whittaker significantly emphasizes the point that it is not so often by seepage through sandy soil from privy or stable that pollution enters a well, as by the actual surface drainage of water from nearby sources of pollution into improperly located and poorly constructed dug wells. This is admirably illustrated by several drawings. There are other drawings showing how wells should be constructed to prevent the entrance of pollution at the top. There are also illustrations showing how springs may be protected from pollution, and drawings depicting the properly and the improperly constructed cistern.

The other bulletin mentioned, "Sewage Disposal in Unsewered Districts," is also profusely illustrated and the topics briefly discussed include, "Location of Fixtures," "The Sewer," "The Disposal or Purification Plant," "The Leaching Cesspool," "The Watertight Cesspool," and finally, under the title "A Permissible Sewage Disposal Plant," Mr. Whittaker describes in a few paragraphs a private disposal plant consisting of a settling tank and a secondary dosing tank with a siphon discharging into a tile grid laid below the frost line in porous soil. A tile underdrain system laid below the grid is recommended especially where the discharge is in very fine compact loam or clay.

*

A Good Cover.—On the cover of the North Carolina *Health Bulletin* for August appeared the following warning in bold face type:

Signs of Tuberculosis.

What Everybody Should Know About the Symptoms of the Great White Plague.

Your chances for recovery depend upon an early diagnosis. The later in its course the disease is found the less chance there is for recovery.

A hemorrhage from the lungs means tuberculosis without exception.

A subnormal temperature (by the thermometer) in the morning and an afternoon rise of temperature means tuberculosis 99 times in 100, and the other time too, unless it can be accounted for otherwise by a doctor.

A low blood pressure, taken with a proper instrument, is suggestive of tuberculosis.

A cough that lasts more than three weeks should suggest tuberculosis, and make you seek an examination by a competent physician.

The tubercle bacillus in the sputum is a posi-

tive sign of tuberculosis, but the diagnosis should be made long before this can be found.

✻

Free Biological Products.—Free smallpox and typhoid vaccines and diphtheria and tetanus antitoxins will be distributed to the indigent poor of the state, announces the September *Bulletin* of the Kansas State Board of Health.

The prices to physicians of the state will also be very much reduced.

✻

Michigan's Opportunity.—In the editorial columns of the *Journal of the Outdoor Life* for September we read:

"Few states have had the opportunity in the anti-tuberculosis campaign which now is offered to the state of Michigan. The recent session of the legislature granted an appropriation of $100,000 for two years of work in the prevention and control of tuberculosis. What can Michigan do with that amount of money in two years?"

Answering his own question the editor concludes that:

"It would seem as if the most logical and wisest expenditure of this money should be first along the line of a survey or study of the tuberculosis situation, and secondly along the line of an extensive and intensive educational campaign that should have for its object the securing of adequate care for every consumptive."

✻

Board of Health Contracts.—That a contract, made between a board of health and one of its members, is illegal and void—is the decision of the Supreme Judical Court of Maine in a recent opinion published in the *Public Health Report* for October 1, 1915.

The plaintiff, one of the three members of the Rumford, Me., Board of Health, had been employed by the board to care for a patient suffering from a contagious disease. Although there was no concealment in the making of the contract, the court decided that it was not proper for the plaintiff to take part as a member of the board in making a contract with himself as an individual. Had he taken no part himself the action of the board must have been influenced by the fact of his membership.

It is submitted that this case is not to be relied upon as representing the undivided opinion of the bench throughout the country upon this point. There are numerous cases in the books where it has been held that a contract made under circumstances similar to those stated here, is valid if there was a majority in favor of it without the vote of the member to whom it was awarded.

✻

Advertising the Department.—A well advised issue of the *Bulletin* of the New London (Conn.) Health Department pictures in a most commendable graphic form the results of the activities of the city health department during the last eight years and correlates with those results, the extent and distribution of its appropriations. An effective diagram also compares the amounts of money received by the various city departments. The booklet deserves praise not only because the diagrammatic method is used, but also because the diagrams are exceptionally clear and quite intelligible to the laymen whom the *Bulletin* is designed to reach. The normal population of New London is nearly 21,000.

✻

A New Voice.—A new name was added to the growing list of regular health publications, when Vol. 1, No. 1, of *Public Health News*—a monthly published by the Department of Health of the State of New Jersey—appeared in August. Director of Health J. C. Price, in his "Word of Greeting," after pointing out the modern tendency toward public health education, concluded:

"*Public Health News* regards itself as a tool, or educational device, with which the State Department of Health may labor against ignorance, indifference and inefficiency in health work. As an antidote for ignorance, *Public Health News* will seek to impart information; as a remedy for indifference, *Public Health News* will strive to arouse interest; as a cure for inefficiency, *Public Health News* will advocate special training and coöperation."

Copies are free on application.

✻

Coöperative Public Health Instruction.—A coöperative course between the junior students in the two medical colleges in Cincinnati, Ohio, and the City Health Department is now under way.

Thirty-two days of actual field work will be required and attendance at a series of ten lectures

by practical health officials and sanitarians comprise the course. The program follows:

The thirty-two days have been arranged as follows:

Laboratory:	
Microscopic	3 days
Milk and Water	1 day
Meat Inspection (Animal Pathology)	3 days
Milk and Dairy Inspection	1 day
Bakeshop Inspection	1 day
Barbershop Inspection	1 day
Outdoor Sanitation	2 days
Fumigation	2 days
School Medical Examination	18 days

The following conferences have been arranged; all students will be expected to attend these practical discussions:

December 2, 1915.

2.00 p. m. Fundamental Principles in Health Conservation. J. H. Landis, Health Officer.

3.00 p. m. The Control of Communicable Diseases. Wm. H. Peters, Chief Medical Inspector.

December 7, 1915.

2.00 p. m. Health Promotion of School Children. Wm. H. Peters, Chief Medical Inspector.

4.00 p. m. The Value of Laboratory Diagnosis. Frank Maltaner, Bacteriologist.

December 9, 1915.

2.00 p. m. Outdoor Sanitation, Interpretation of Common Terms. Jacob Shuey, Assistant Chief Sanitary Inspector.

3.30 p. m. Disposal and Purification of Sewage. W. C. Folsom, Chief Sanitary Inspector.

December 14, 1915.

2.00 p. m. Vital Statistics. E. Walter Evans, Registrar.

3.00 p. m. Water and Water Purification. W. C. Folsom, Chief Sanitary Inspector.

December 16, 1915.

3.00 p. m. Principles of Dairy Inspection (Illustrated); Meat Inspection. R. B. Blume, Chief Food Inspector.

December 21, 1915.

3.00 p. m. Standard Methods of Milk Analysis and Water Analysis. Clarence Bahlman, Chemist.

*

Baby Week.—Indianapolis babies had the center of the stage in that city for an entire week's performance October 3–9.

Literally thousands of people accepted the opportunity to inspect and appreciate the infant welfare work and the institutions—public and private—for carrying on this work. The program for the week consisted of special services in churches and exercises in schools, visits to various private institutions, such as hospitals, settlements, milk stations and the juvenile court; inspection of playgrounds; and culminated in a baby show.

Following closely Disease Prevention Day on October 1, interest was easily aroused and the response more general.

*

47,000 Immunized.—In ten counties in North Carolina forty-seven thousand people were given the typhoid prophylactic treatment in a wholesale experiment carried on by the state. The average cost per capita immunized in the last twenty-five thousand was 14.2 cents. The interest created waxed to such proportions that the State Health Department was unable to carry on all of the work that was demanded—with the result that several local campaigns in other counties were started, and a large number of treatments given.

Public Health Notes.

Minnesota Public Health Association Meeting.—On September 29, a very enthusiastic public health meeting was held at Rochester, Minnesota, under the combined auspices of the Minnesota Public Health Association and the Minnesota State Sanitary Conference. This meeting was held at the Mayo Clinic at the Mayo Hospital, Rochester, and the attendence was so large as to test the capacity of the auditorium. Among the speakers at this conference were Governor Hammond of Minnesota, President Vincent of the State University, and Dr. H. M. Bracken, Executive Officer of the State Board of Health.

A great deal of credit for arranging and carrying out the excellent program which was presented belongs to Dr. I. J. Murphy, who is president of the State Sanitary Conference, and acting executive secretary of the Minnesota Public Health Association.

An encouraging evidence of a desire for greater coöperation on the part of the health officers of Minnesota and other persons interested in the cause of public health is the fact that at this meeting it was decided to consolidate the two organizations holding this program and to continue the State Sanitary Conference as a section or committee of the Minnesota Public Health Association. Among the topics discussed at this meeting were the following: The Clean Milk Problem, Chronic Pathological Changes of Middle Life, Community Control of Tuberculosis, School and Municipal Health Nursing, The Control and Prevention of Typhoid.

⚜

Insurance Companies vs. Alcohol.—Valuable testimony of the undoubted effect of alcohol on the general health and longevity of men who use it in varying degrees was submitted in statistical form at the Eighth Annual Meeting of the Association of Life Insurance Presidents, as pointed out by the New York City *Weekly Bulletin* of the Department of Health of July 31. Additional significance is given these figures because the purpose of their preparation was not "to excite public interest or curiosity but for actual use in a great business." The statistics were compiled by 43 leading companies and covered two million lives over a period of twenty years.

"With regard to men who had used alcoholic beverages daily but not to excess, the experience of the companies was divided into two groups: (a) men who took two glasses of beer, or a glass of whiskey, or their equivalent, a day; (b) men who took more than the foregoing amount, but were not considered by the companies to drink to excess. *The mortality in the second group was found to be fully fifty per cent. greater than in the first*, an excellent argument for moderation in the use of alcoholic beverages.

"The Committee of the Medico-Actuarial Mortality Investigation did not make a report on the mortality among total abstainers, but *sufficient statistics have been published by individual companies to justify the statement that persons who have always been total abstainers have a mortality during the working years of life of about one-half of that among those who use alcohol to the extent of at least two glasses of whiskey per day.*"

The JOURNAL has printed notes touching this topic before and it is interesting to note that the material of this sort which is being circulated is constantly increasing.

⚜

Octavia Hill Association.—Nearly 4,000 Philadelphia families sleep, cook, eat, wash their clothes, entertain their friends and even take in boarders in single rooms! Along with this statement comes the announcement in a bulletin recently published by the Octavia Hill Association of Philadelphia, that sanitary houses can be furnished the working man at a rental within his reach by this organization, and that the money so invested yields and has yielded for 18 years—the proper and reasonable return of 4 per cent. per annum.

In the bulletin is a very interesting "plan for a model set of houses with playground."

⚜

Standard of a Habitable House.—The March *Journal* of the Royal Sanitary Institute contains a discussion by A. B. Dunne regarding the standards upon which judgment should be based

regarding the habitability of a house. The conditions justifying the representation of a house as so "dangerous or injurious to health as to be unfit for human habitation are as follows:

"1. Dampness in living rooms of old houses, due either to walls built without damp courses, or of very hygroscopic materials, such dampness rising up the walls to a considerable height, or extending over a large area, and persisting even in dry weather.

"2. No through or sufficient ventilation. Among such dwellings I would include those houses which are built 'back to earth,' where the adjacent earth reaches a high level, and back to back houses, so common in the northern towns.

"3. General dilapidations, under which I include cottages with walls perished, roofs leaky, rafters rotten, bedroom floors sprung and unsafe, and broken tiles laid on earth.

"4. The hopeless cases, for instance, dwellings which have been improvised out of old malt-kins, barns, cart-sheds, and other miscellaneous buildings."

✻

M. V. P. H. A. Holds Meeting.—The annual meeting of the Missouri Valley Public Health Association at Kansas City, Mo., September 28–29, succeeded in creating a large amount of enthusiasm. Among other speakers of note, Dr. Lydia A. DeVilbiss, Bureau of Child Hygiene, discussed "Child Hygiene and Public Health," ably, and Mr. D. O. Decker, Civic Commissioner, St. Joseph, Mo., struck a responsive chord when he ended his paper on "The Relation of Public Health and Business" with—"Talk Prevention. Keep before his (the business man's) mind the fact that half our deaths under 40 years of age are preventable; that public health is the cheapest form of life insurance we have, and pays dividends in keeping him alive, not in burial expenses. Ask him to look over his accounts and see how much he has lost through preventable sickness among his customers."

✻

Sherley Amendment Constitutional.—The following note from the *Public Health Report* for October 8, 1915, tells of another forward step in the legislative fight against patent medicine quacks:

"The United States District Court for the Eastern District of Pennsylvania has decided that the Sherley amendment to the United States food and drugs act is constitutional. This amendment makes it unlawful to print on the package or label of any drug false and fraudulent statements regarding its curative or therapeutic effects.

"The defendant was charged with misbranding a proprietary medicine which was sold under the name of 'Bad-Em Salz,' and with making false and fraudulent statements as to the curative properties of the remedy. The defense denied that the remedy was misbranded or that the label was calculated to mislead purchasers as to the composition or ingredients of the drug. It was also asserted that the statements relative to the curative properties of the drug were honestly made, that they were expressions of opinion, and that the defendant could not be convicted of crime merely because an opinion was expressed regarding the effects of the drug which differed from that of most physicians.

"The court held that the two questions (1) whether the name and label were such as to mislead purchasers respecting the composition of the drug, and (2) whether the statements regarding the curative properties of the drug were false and fraudulent, were both questions of fact which it was the duty of the jury to decide. The jury having decided both questions in the affirmative the conviction of the defendant was sustained."

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Second Pan American Scientific Congress.—The second Pan American Scientific Congress will be held at Washington, D. C., December 27, 1915, to January 8, 1916.

The first meeting of this kind was assembled in Santiago, Chile, in 1908.

Of particular interest to public health men and sanitarians will be the work and laboratory conferences of Section VIII, Public Health and Medical Science.

This section, one of the most important of the Congress, will discuss subjects of vital Pan American interest in the field of infectious and nutritional diseases, vital statistics, public health measures, sociological medicine and sanitation. A most valuable feature of the program of this section will be the three laboratory conferences on Anaphylaxis, Protozoa and Cancer. The leaders of these three symposia, in which some of the most eminent Pan American special-

ists will take part, are respectively Dr. John F. Anderson, President American Public Health Association, Washington, Professor Gary N. Calkins of Columbia University, and Dr. Leo Loeb, Director Department of Pathology, Barnard Skin and Cancer Hospital, St. Louis.

The Chairman of this Section is Surgeon-General William Crawford Gorgas, perhaps the most distinguished American expert in tropical medicine of Pan American reputation.

Glen L. Swiggett, Ph. D., Pan American Union, Washington, D. C., is Acting Secretary-General.

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Fuller's Earth or Kaolin.—"According to the researches of Hektœn at the Memorial Institute for infectious diseases, kaolin properly applied in the form of a dry powder removes diphtheria bacilli in the course of three or four days. For this purpose the kaolin is blown into the nose or throat six or seven times a day at two-hour intervals through a glass tube. The insufflation is repeated several times at each treatment. The success of this measure appears to depend largely on the free and thorough distribution of kaolin over the nasal surfaces.

"In a number of cases, in some of which there were a great many diphtheria bacilli in the throat, complete and apparently permanent removal was accomplished in from two to four days, the throat to a large extent being freed from all bacteria.

"It seems, then, that kaolin may prove of great value in removing pathogenic bacteria from various surfaces of the body by virtue of its mechanical effect. This may prove of especial advantage in sterilizing 'carriers,' some of whom prove exceedingly obstinate under other treatment.

"In acute infections this medication is worthy of wide application by the profession—and a careful record should be kept and reported to establish its final place in antisepsis. If its value is proven, it will be a boon to public health in the control of contagious disease."—*Bulletin*, September 25, 1915, Chicago Board of Health.

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Saving the Sight of Babies.—An admirable article under the above heading appeared in *The Survey* for October 9, 1915. The author is Carolyn C. Van Blarcom, secretary of the National Committee for the Prevention of Blindness. The following excerpt is interesting:

The value of some such practical work as outlined above has been demonstrated in a few, but deplorably few, of our American cities. Conspicuous among these is Buffalo, where each physician has recently been notified by the Department of Health that:

"'1. Babies' sore eyes is a reportable disease, under the state law.

"'2. It is the intention of the department to prosecute doctors and midwives alike who are found to be disregarding this legal requirement.

"'3. As the sole purpose of the department in taking this attitude is to safeguard the eyes of babies, it will give as much assistance to the doctors as they wish or will accept; and, therefore,

"'a. Nursing service and bacteriological examinations are offered to those doctors who request this form of assistance, or

"'b. Hospital care will be provided for those infants who need more attention than can be given at home.'

"More than this, a nurse from the Bureau of Child Hygiene visits each midwife case reported, to ascertain, among other things, the condition of the baby's eyes. If any redness, swelling or discharge is discovered, this information is telephoned to the chief of the bureau, and a doctor is sent without delay.

"It cannot be denied that such work as is being carried on in Buffalo would be impossible for many local health officers to undertake because of the absence of legal authority to act; lack of facilities to carry out the law should one exist; or, most important of all, lack of support of such public health work by the community. No amount of effort on the part of the health officer can be effective if, after bringing a case into court, the judge dares to throw it out with the remark: Any baby may have sore eyes, just as anyone may fall downstairs—as actually happened in Connecticut."

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Focusing Public Opinion.—"Working through 890 local committeemen, the Ohio Public Health Federation was able so to direct public opinion that, during the eighty-first General Assembly of the state, nine health bills which the federation endorsed were enacted into law, eight which

it opposed were defeated and only five failed to pass which it had approved.

"Such is the encouraging report of the first five months' activity of the federation. The organization aims 'to unite the activities of all state organizations interested in public health and so bring into publicity each legislative measure dealing with the health of the people.' It includes the following seven societies, each of which has an accredited representative on the executive council of the federation: the state medical, dental and pharmaceutical associations; the homeopathic and eclectic societies; the veterinary medical association, and the anti-tuberculosis society.

"These volunteer organizations had worked separately in the cause of public health in other years. But the results were unsatisfactory; much energy was wasted through duplicated efforts; and legislative campaigns were weakened by a lack of definite information regarding pending health measures. To remedy this, a plan was devised and carried out this year, whereby frequent confidential bulletins were sent from the central legislative council to coöperating committeemen, each committeeman keeping in touch with the member of the legislature residing in his county."—*The Survey*, September 4, 1915.

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Later History of a Typhoid Carrier.—The story of the observation of a typhoid carrier during fourteen months following his apprehension in 1912 is told in a reprint from the *Journal of the American Medical Association* for June 19, 1915. The carrier, "H. O.," who was observed by Dr. Wilbur A. Sawyer, Secretary of the California State Board of Health, was distributing a particularly virulent variety of B. typhosus on board a ship before discovery. His victims numbered twenty-seven. The following summary and conclusions are of unusual interest:

"1. Although frequent examinations of the feces of the typhoid carrier H. O. gave negative results for four months after he had been treated with autogenous typhoid vaccine, he infected three persons when subsequently released from quarantine on parole. The total number of persons infected by this carrier is thirty, including five who died.

"2. In a further attempt to cure this carrier, the gallbladder and its duct were removed surgically, but the typhoid bacillus was found in the feces several times after the operation. Examination of the gallbladder showed that it was normal and that its contents were free from typhoid bacilli.

"3. After forty-one successive examinations of feces during a period of fourteen months, all with negative results, the typhoid bacillus was isolated from stomach contents containing bile.

"4. Certain typhoid carriers are unusually dangerous and must be controlled by quarantine or other adequate supervision."

*

Hurrah for the "Superintendents."—Compulsory medical examination of school children was endorsed by the Convention of County Superintendents which held its annual meeting in the House of Representatives at Indianapolis, June 17, 18. The resolution was as follows:

WHEREAS, The health of the school child is paramount, all progress and improvement being dependent upon health, and

WHEREAS, Actual experience in medical inspection has shown that 60 to 80 per cent. of school children are handicapped by physical defects and disease, therefore be it

Resolved, By the Annual Conference of County Superintendents that compulsory medical examination of school children should be instituted. We therefore recommend to the 70th General Assembly of the State of Indiana that medical inspection and proper health care of children by parents be made compulsory.

*

Sea Air vs. Surgical Tuberculosis.—At the corner of Surrey Avenue and the Boardwalk, Ventor, Atlantic City, is located The North American Children's Sanitarium. It is the culmination of the fourteen years of successful work on the part of a group of people inspired by the *North American* of Philadelphia (1901–1909). The original purpose followed through nine years was to care for children suffering from non-contagious diseases during the hot summer months. European and American experience has led to the observation that sea air is especially beneficial to sufferers from surgical tuberculosis, and so, since 1909, the present institu-

tion has restricted its admissions to poor children with surgical tuberculosis.

This step has been justified, in the opinion of experts, many times over. The present capacity is forty-five beds—in which were treated during the year ending March first, 1915, seventy-nine patients. The average age of the patients was $5\frac{1}{2}$ years and the average stay 131 days.

Personal Notes.

Mr. Frank Bachmann, formerly of the Illinois State Water Survey and for the past five years assistant chemist and bacteriologist at the Sewage Testing Station of the Sanitary District of Chicago, has accepted a position as analyst to the Sanitary Engineering Department of the California State Board of Health.

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Four new whole time county health officers were elected in North Carolina during September. They are: Dr. C. D. Absher of Vance County, Dr. M. T. Ezerton of Pitt County, Dr. E. R. Hardin of Sampson County, Dr. J. C. Braswell of Nash County.

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Dr. David N. Roberg, the newly appointed state health officer of Oregon, will assume charge well equipped to perform the duties of his office. After graduating from Rush Medical College in 1908, Dr. Roberg served his interneship and in 1910 came to Portland as professor of anatomy in the Medical Department of the University of Oregon. Later he was given the chair in pathology, remaining in charge until 1913, when he resigned to go to the Orient as a special officer of the State Board of Health for the purpose of studying those tropical diseases, especially cholera and plague, which may at some time menace the health of the United States. The bill providing for such an appointment was passed in 1913 and was part of a movement participated in by several states.

Dr. Roberg remained in the Orient two years. During the first year he was stationed in Manila and took the degree of Doctor of Tropical Medicine in the Graduate Department of the University of Manila. From there he went to Shanghai and became associate professor of preventive medicine in the Harvard Medical College in that city. Upon the expiration of the term for which he was appointed by the State Board of Health, he returned to Oregon and was elected state health officer by the members of the board. The diversified opportunities which he has enjoyed should be of great value in maintaining the high standards of the State Board of Health. Proud of the achievements of the board, the physicians of Oregon can be counted on to lend him every assistance and a bright future is before him.—*Northwest Medicine*, for October.

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Dr. Edward Guion of Atlantic City was recently appointed president of the board of examiners of health officers and sanitary inspectors of the state department of health, and A. Clark Hunt, M. D., of Metuchen, secretary and treasurer.

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Dr. John F. Anderson, who was elected president of the American Public Health Association at its meeting in Rochester, has resigned as director of the Hygienic Laboratory of the United States Public Health Service and has accepted the position of director of E. R. Squibb and Sons biologic laboratory, New Brunswick, N. J.



This excellent cartoon is reproduced in the Journal through the courtesy of the Indianapolis News. It will be remembered that the subject of the Editorial in the September issue of the Journal, "Disease and Disaster," was the same as that treated in this cartoon. Cartoons do indeed speak more emphatically than words.

Industrial Hygiene and Sanitation.

Iodine for First Aid Use.—*Factory* for August reports the provision for first aid work made by one of the large corporations of the business world as follows:

"Two bottles stand ready in each Department at Sears Roebuck & Company's plant for the employee who cuts, scratches or bruises himself. One is a 2-oz. glass-stoppered medicine bottle containing tincture of iodine. The other, a wide-mouthed bottle, contains applicators made of tooth picks with cotton rolled on their ends.

"Instructions for the use of iodine follow:

" 'When you have a small injury about your body whether it is a cut, a scratch, a bruise, or any other kind of injury, paint it over with iodine at once and it will prevent blood poisoning from starting.

" 'As soon as injured dip a tooth pick with cotton rolled on the end of it in the iodine and paint over the wound without washing. The iodine will kill all germs in the dirt that goes into the wound, while washing only scrubs the germs farther into the wound.

" 'When painted with the iodine, wrap the injured part in a clean cloth for a couple of days.' "

*

An Endowed Factory Nurse.—The Deere Farm Implement Company has undertaken a new departure in industrial health work. The company has set aside a fund as an endowment for the purpose of maintaining a factory nurse. This nurse will perform among the employees of the company the services generally provided by visiting nurses. She will visit all employees of the company living within the city limits of Moline without charge. The fund out of which this nurse is to be paid has been placed in trust with a local women's organization, which employed a visiting nurse of its own for general service in the city for a number of years previous to this undertaking of the company.

*

A Company's Message to its Men.—The Ford Motor Company has published a truly remarkable booklet entitled "Helpful Hints and Advice to Ford Employees."

On the title page is the statement that the Company wishes its workers to make the best use of the opportunities the company offers them. The whole publication shows that the Ford Company is keenly alive to the fact that healthy happy men are profitable employees.

This booklet is attractively printed in two colors on excellent paper and is illustrated on almost every page with half-tones illustrative of the improvement in the living condition of Ford employees since the inauguration of the profit-sharing plan now in force.

The text of the pamphlet explains to the workmen the profit-sharing plan, and goes into some detail in making it clear just what standard of improvement in living conditions the company expects of its men as a result.

There are suggestions regarding the personal hygiene of employees. These are followed by "Suggestions for the home" and several paragraphs describing some of the welfare services maintained by the company.

Mr. Ford's own convictions regarding the social uplift of industrial workers has been extensively commented on in the public press, but the following sentence from the paragraph on "Investigators," indicating the earnestness of the Ford Company in its effort to carry out this conviction in practice, is worth quoting:

"The investigators are engaged as important factors in one of the greatest, if not the greatest, industrial sociological plan for the benefit of humanity ever attempted; entirely new in its conception and far reaching in its ultimate end."

This pamphlet is an out-standing testimonial to the possibilities for better living conditions among the workers in large industries; and the scheme of this company, although only in its veriest infancy, promises the solution of many tough problems—social, and even political, in communities where they are given a fair trial by men with big souls and strong enough purpose to make a fight for the thing that ultimately counts in the world's industry—humanity.

A reading of this pamphlet suggests that the Ford idea might be expressed in epigram as follows: *The Company helps those who help themselves.*

Education of the Employer.—The first annual report of the Department of Shop and Factory Inspection of the State of Tennessee contains a tabulation of orders and suggestions issued relative to the improvement of working conditions and factory sanitation.

Over one tenth of these suggestions—119—were for improved sanitation and 69 more referred to ventilation and the separation of toilet facilities for the sexes. Seventeen more called for first aid chests.

One is at first struck by the fact that there were almost a thousand suggestions and only 22 orders, but inasmuch as two thirds of the suggestions had been complied with and only 3 out of the 22 orders are so listed, suggestions are apparently an effective means of securing the improvements of the sort recommended.

If this indicates, as would seem to be the case, that operators comply with suggestions in a 66 per cent. proportion, whereas only one seventh of the orders issued have been enforced, it is a fact worth thinking about.

Education and friendly suggestion is always a more potent weapon for health authorities than the police power, whether it is sought to reach the man who neglects his own personal hygiene and sanitation or the employer who disregards the health of his workers.

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Nitric Acid Accidents.—*Safety Engineering* for September reports a discussion at the Cincinnati convention of the International Association of Fire Engineers on the subject "Proper Restriction for Storage and Handling of Nitric Acid." Chief John F. Healy of the Denver Fire Department stated the following brief summary of precautions to be observed in nitric acid accidents:

Precautions to be Observed in Nitric Acid Accidents.

"As a summary of the above, the following should be strictly observed:

Don't throw sawdust on nitric acid.

Don't throw soda on nitric acid.

Don't use a portable chemical, or chemical engine on a nitric acid fire.

Use an abundance of water to dilute the acid.

Use extreme care when entering the room, to avoid unnecessary inhaling of these gases. If possible, move in the direction in which the wind is blowing.

Inhale alcohol, ether, or weak ammonia.

Drink milk or cream.

Take chloroform internally as above prescribed. Go to bed immediately and call a physician.

In case of sodium nitrate fires, water must not be used, as this causes explosion, scattering the fire in all directions. Sand or dirt is best used for smothering fires of this description."

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A Surgical Magnet.—October *Factory*, in the description of an illustration showing the use of a magnet for withdrawing an iron particle from a hand injury, contains the following expression. "Magnets which remove iron particles from wounds are valuable although they do not measure their work in tons."

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Cigarettes vs. Automobiles.—The Cadillac Motor Car Company has posted throughout its factories the following notice:

"Cigarette smoking is acquiring a hold on a great many boys in our community. The habit has grown in the last year or two. Since it is such a bad practice and is taking such a hold upon so many people, we think it is a disgrace for a grown man to smoke cigarettes, because it is not only injurious to his health, but it is such a bad example to the boys. Boys who smoke cigarettes we do not care to keep in our employ. In the future we will not hire anyone whom we know to be addicted to this habit. It is our desire to weed it entirely out of the factory just as soon as practicable. We will ask everyone in our factory, who sees the seriousness of this habit, to use his influence in having it stamped out. We have two objects in interesting ourselves in this matter: first, to help men and boys; second, we believe that men who do not smoke cigarettes or frequent the saloon can make better automobiles than those that do."—*North Carolina Health Bulletin*, August.

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Health and Industrial Efficiency.—Numerous publications, which are nowadays being issued by state and municipal health departments and by private corporations as well, are avowedly directed toward the improvement of the health of the worker. What are the incentives for all of this interest in the health of workers? The

motive of the governmental health agencies is presumably a humanitarian one, coupled with the fact that it is the duty of the state to do for the individual those things which he cannot do for himself but which are nevertheless essential to the weal of the social structure.

Is the motive of the corporations which are spending large sums to money on the departments of safety and sanitation the same altruistic one? We may doubtless say that their aim is in part a truly humanitarian one, but even if it were not there is still sufficient reason why industrial corporations should give some attention to the physical welfare of their employees. In short, it pays to have healthy workmen. Not long ago there was published in this section a note explaining how the Canadian Pacific railways had cut down the number of days of lost time to a remarkable extent through the anti-typhoid inoculation of a large number of its employees. The man of big business has long since learned that science can help him to turn out his product more cheaply. Chemistry in particular has been more and more relied upon in industry. Bacteriology and sanitation and hygiene is going to be more popular in the future.

Sanitary conveniences are almost everywhere. The common drinking cup is admittedly "a vain thing for safety" and so is the roller towel. With the sanitation provided we must turn our attention with greater insistence to the demand that the workers shall know more of the duties of hygiene they owe to themselves. Cleanliness, proper exercise, proper food eaten the right way in the right proportions and quantities, care of teeth and fresh air, yes, fresh air again. These are some of the things that we must induce people to take into account more seriously in their daily living. The sanitary problems which I have indicated of being more advanced than the hygienic ones, are problems which have to do with *things;* the hygienic problems have to do with *folks.* Therefore their solution depends not upon erecting buildings and having certain things in them but upon telling folks how to live and use the things they already have.

The man who knows more about himself and his body and its care is a better educated man than the one who does not and he is a better workman all around, not only because he is less likely to become sick and hence inefficient but because he will be relatively *more* well, more efficient, all the time. Health does make for industrial efficiency.

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Paper Towels for Workmen.—In many industrial establishments the executives hesitate to make use of paper towels in place of the old fashioned insanitary roller towel because the workmen are wasteful of the paper ones, using more sections than necessary at one time. A recent issue of *Factory* reports that in one large establishment the department foremen give actual demonstrations to the workmen of the manner in which these towels should be used. It is reported that once the operation was really understood by the men they very cheerfully followed the directions that had been given them and the consumption was reduced by a large percentage.

It is a familiar sight in washrooms for the use of large numbers of persons, to see some one give the paper towel roll a pull which unwinds two or three times as much as he wishes to use. Almost never does the man take the trouble to rewind this excess and it goes into the waste basket. One brand of these towels both in its advertisements and on the wrappers prints the advice, "Use the first section as blotter to soak up the water clinging to the hands, then wipe dry with the second." Any one who will take the trouble to try this will find that it is sound advice. If factories would supply paper towels and see that their men understood how to use them, the expense would, in most instances, be little if any less than for roller towels, and, in addition, the cost in time through infection from common towels, which is, beyond doubt, an appreciable factor during a year's time in a large factory, would be eliminated.

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SOCIAL ASPECTS OF SCHOOL HYGIENE.

Donald B. Armstrong, M. D.,
Director, Department of Social Welfare, New York Association for Improving the Condition of the Poor.

Doctor Armstrong uses New York City as an example in his thoughtful paper. What he says of school hygiene there will be found to apply with equal, if not greater, force elsewhere. There is always the danger that in the pressure of routine duties the larger objects are apt to be lost sight of. Doctor Armstrong's excellent analysis should make us pause and take stock of the broader views of the whole question of School Hygiene.

THE New York City Department of Health budget request for 1915 included an item of approximately $27,000 for additional dental clinics. This was justified on the ground that the 1913 records of medical inspection of the school children showed that about fifty-nine per cent. of the school enrollment were in need of dental care and that there were about 524,000 cases of dental defects in the city schools. Investigation proved that the meagre public and private facilities were totally inadequate to meet the demands of this situation. However, this request failed of approval by the Board of Estimate along with others of a similar character. This failure to take even a slight step forward toward the perfection of the preventive and remedial mechanism was a result of several factors among which were the following:

1. The pressure of the presumably well intentioned but often narrow-visioned opponents to the meeting of municipal responsibilities, opposing, on the grounds of short-sighted real estate or other private interests, any actual budget increase, even though a little study of the situation offers convincing proof that an ounce of prevention is still worth a pound of cure even in municipal affairs and that an increased gross expenditure for dental clinics would quite possibly mean a decrease in the final tax rate.

2. A seemingly incomprehensible preference on the part of some members of the Board of Estimate to the expenditure by the Board of Education of $3,600,000 now devoted annually to the reëducation of children held back in their classes probably in part at least by incapacitating though preventable and curable physical and mental defects. Twenty-seven thousand dol-

lars refused for prevention, $3,600,000 authorized for reëducation, part of which is for ineffective cure!

3. A lack of appreciation, first, of the economy of prevention and second, of the social responsibility which the city has to meet in providing wherever possible a sound physical foundation as a basis for the educational process.

4. There was lacking also an intelligent public opinion strong enough to make itself felt. Evidently it is the principles of prevention that must be taught and the false economy of ineffective curative and palliative measures in social organization.

This experience of the New York Department of Health is duplicated thousands of times in this country every year. It illustrates one social aspect—a very defective aspect—of school hygiene. It brings home the fact that our sins of today are *social* sins, such as child labor, prostitution, the prevalence of tuberculosis in industry, preventable but unremedied physical defects among school children, etc., rather than the much simpler sins of a few decades ago such as gambling and Sabbath breaking.

When one looks at the problems of public health in general or perhaps in particular of school hygiene, in a broader sense, it must be realized that the physical and mental ills that seemingly in an isolated way affect the individuals under observation, are indeed in reality evidence of *social* defect. They are, for the most part, social diseases to be controlled by social instruments. The retarding effect in the classroom of obstructive adenoids and tonsils, so far as the individual is concerned, is the result of an hypertrophy of glandular tissue; on the other hand and indeed more fundamental, the existence of these respiratory defects in a group of school children is indicative of such predisposing factors as a defective social organization for the detection and removal of school children's physical defects, lack of a preventive sense of social responsibility on the part of the school or health authorities, the appropriating bodies or possibly of the community at large, and a deficiency of social control by the state over the enforced environment of its potential citizens. Health defects are, for the most part, a manifestation of social disease. Eventually most, if not all disease, including the affections of school children, will probably be looked upon as a social defect and in this broad sense, therefore, all preventive, medical or constructive health work is of profound social significance.

To turn to the consideration and practical interpretation from a social and economic point of view of certain phases of health work, and particularly of school hygiene, one does not have to search far for illustrative material. Before proceeding with the main theme, however, one or two more or less haphazard observations may lend emphasis to the argument for a social interpretation of modern educational phenomena. One thinks, perhaps, first of the available mechanism for meeting the school health problem. This mechanism must be two sided. It must first discover the defects and the diseases; it must then cure. In addition there is much that can be

done by preventive, educational efforts and by positive, constructive health activities carried on through such agencies as the gymnasium, the playground, etc. How adequate is our discovering and remedial equipment? In New York City, which is by no means comparatively backward in this regard, the health of nearly 900,000 school children in over 700 school buildings, spread over an area of 326 square miles, is cared for by less than 350 doctors, nurses, surgeons and dentists, under the direction of the Health Department. Studies by the Bureau of Welfare of School Children of the Association for Improving the Condition of the Poor and by other agencies have emphasized the fact that this staff is wholly inadequate to care for the physical welfare of the school population. It is possible to examine only 37 per cent. of the school population each year, and of those examined 69.7 per cent. are reported in need of medical or dental attention. So much for the discovering mechanism. On the other hand, only 23.9 per cent. of the 69.7 per cent. discovered, are reported as treated for physical defects. A still smaller per cent. are actually cured. Inadequate as may be the channels for discovery, the facilities of a remedial character fail even more tragically to meet the situation.

Another thing of social significance to be mentioned here only in general terms is the intimacy of relationship and the interdependency between home and school conditions. It is easy to understand the inevitable social and economic reactions between the school and the home. We must remember also certain very specific relationships or at least potential relationships, such as, for instance, the indirect and hitherto unconscious effect of a hygienically and attractively served luncheon to the school child at noon, upon the mother and family in the tenement home. The not infrequent appearance of the mothers at the school lunch room, to inquire as to the preparation of a dish which particularly appealed to the son or daughter, gives opportunity for instruction regarding food selection, food preparation, sanitary food protection and the economy of proper refrigerating methods in the home, etc. Thus the school lunch has an unexpected educational, economic and social significance. This is a phase of home and school contact, suggestive of many other similar possibilities, illustrative of an almost untouched field of potential social reaction.

There are many things to be realized in a complete consideration of the social aspects of school hygiene, only the seemingly more important of which can be touched upon here. Before considering the strictly social phases of the problem, there are certain closely allied factors of more or less economic significance which might at least be briefly summarized.

1. *The Economy of Prevention.*— This was illustrated by the dental clinic proposal discussed at the beginning and in any case it ought assuredly to be unnecessary to say more than a word on this subject. In all phases of health work we have been preaching prevention rather than palliation, prophylaxis rather than cure, and it is

to be hoped that these principles, motivated by economic and social, as well as by humane considerations, will more effectively permeate the field of school hygiene. The economy of disease and defect prevention in comparison with the cost of reëducation ought to be obvious. This does not seem to be the case, however, and because it is realized that the economy argument, the decreased tax-rate argument, is the only effective instrument for the elimination of the antisocial inhibitive influence of selfish interests, the Bureau of Welfare of School Children in New York City is now conducting a study to ascertain the exact effect of defect correction upon school progress and the cost of this correction as compared with the cost of reëducating children retarded because of defective hearing, poor eyesight, adenoids and tonsils, deviated nasal septa, spinal curvatures, etc. Thus far only a small amount of preliminary data has been collected, though the following tabulation based on the ratings of twenty-four children in a public school on the lower East Side in the Borough of Manhattan may be perhaps considered indicative of what one would expect to find regarding the effect of defect correction upon school progress. Of course from figures so small as these it is impossible to draw final conclusions.

ERRORS IN REFRACTION CORRECTED.

	Before.		*After.*	
Rating.	Conduct.	Work.	Conduct.	Work.
A	16	3	18	3
B	7	19	6	20
C	1	2	0	1

As supplementary data in this connection reference should be made to a New York study conducted recently into the dental situation, where, after an examination of 1,394 cases treated at the municipal dental clinics, it was discovered that 566 cases or over 40 per cent. were under grade to the extent of from one to nine years, the average retardation being 1.86 years. How much of this retardation was attributable to the dental neglect is difficult to say without the further investigation now under way. It would seem, however, that the likelihood of a cause and effect relationship was great.

2. *The Necessity for Health Conservation.*—To use New York City as an example again, the results of the 1913 medical inspection of school children may be seen in the following tabulation:

PHYSICAL DEFECTS AMONG NEW YORK CITY'S SCHOOL CHILDREN, 1913.

Type of defect.	Number discovered.	Per cent. of children defective.	Estimated total defects if all had been inspected.
Vision	27,629	8.4	74,600
Hearing	1,645	.49	4,441
Defective nasal breathing	29,507	8.9	79,669
Hypertrophied tonsils	39,958	11.2	99,787
Pulmonary disease	590	.18	1,593
Cardiac disease	2,556	.77	6,901
Chorea	1,446	.44	3,904
Orthopedic defects	1,940	.45	4,023
Malnutrition	13,991	4.2	37,776
Defective teeth	194,207	59.	524,359

From this table it can be estimated that in the year 1913 there were probably about 837,000 cases of physical defects among the school children of New York City. This is not only a tremendous loss in efficiency, a great economic waste, an extremely poor conservation of human resources and a severe handicap upon the workings of the educational system, but it is placing an unnatural and an unnecessary limitation upon the social and economic welfare of a vital part of our national structure—the children, our potential citizens. A great deal of this disability is preventable or curable. Ought we not to realize that this is not only possible but worth while?

3. *The Value of Well Directed Health Expenditures.*—At the present time health appropriations, or at least appropriations for work done under the direction of health departments, although still meagre, are on the increase and now is an exceedingly crucial time in the expenditure of these public funds. It is especially necessary to spend them wisely and to spend them where they will do the most good. There are thousands of things that ought to be done and thousands of things the modern health department would like to do. It is not possible to do them all at once and since there must be a selection of activities, it is essential that those things be done first which are most worth while; which promise the biggest returns; which will prevent the most sickness; which will act most strongly as a health conserving agent.

The contrast between health and pseudo-health expenditures is no more clearly illustrated than by the appropriations for health departments, particularly in some of our smaller cities and towns. Here is seen most clearly the necessity for popular education which shall make possible rational value judgments concerning matters of health importance. The school hygienists, struggling for health department funds, frequently meet in battle with the plumbers and nuisance abaters before the august judges clothed with appropriating powers, and almost as frequently go down in defeat. In Auburn, New York, in 1913, out of a health appropriation of $12,320, $7,000 or 57 per cent. was spent on garbage disposal, leaving approximately $5,000 for such measures as the control of communicable diseases, anti-tuberculosis work, infant welfare work and school hygiene. In 1913, Elmira appropriated $6,000 for health and spent $1,200 for plumbing inspection; at the same time Elmira is credited with having no school inspection. This $1,200 spent on pipes and drains would be immensely more effective if devoted to the removal of defects in human plumbing, such as the adenoids and tonsils of school children. It is a contest between soil pipes and wind pipes, with the odds all in favor of the non-human variety. Fortunately in our large cities the health department budget does not have to cover plumbing inspection; in most of them the burden of garbage disposal has also been transferred to other municipal departments although nuisances of doubtful health significance are still abated by health inspectors. So long as it remains unusually difficult to obtain money for a

genuine health expenditure, such as medical school inspection, it is not economy to make the health appropriation cover a number of non-health activities.

On the distinctly social side of the question there are a number of points, many of which are generally applicable to all health work and a few of which are of special significance in school hygiene. Perhaps we can briefly present the more important of these as follows:

1. *Causes Direct and Indirect.*—In all health work, in anti-tuberculosis campaigns, in infant welfare agitations, in the elimination of physical and mental strain, fatigue and the neuroses of industry, in the prevention of physical defects among school children, it is essential that we be not blinded to the underlying, indirect, economic and social factors in the etiology of our problem. In health work one finds without difficulty many questions which are on the surface apparently straightforward health and disease problems and in connection with which because of the imperativeness of the health aspects, those interested in their solution fail to recognize and consequently do not attempt to deal with the underlying etiological factors, often of a distinct social and economic character. Such seems to be true, for instance, in many of our attempts to control and particularly to prevent disease among children. The workers are frequently concerned exclusively with the direct, exciting causes, such as bad food, improper diets, poor light and ventilation, bad seating facilities, filthy toilets, congestion, dangers of contact infection, etc.

For the most part those interested, suffering from an almost inevitable myopia association with close contact with the details of a problem, fail to see it in its entirety; they do not see the necessity for the correction of such predisposing factors as the inadequate family income, lack of adequate instruction regarding economic expenditures for and the proper use of foods, our unimaginative, individualistic, competitive system of industrial organization, the economic dependence of the mothers of the school children, the effects of bad breeding on the racial stock, the necessity for healthy soil in which to sow the seeds of education. In school hygiene there are very few directly causal conditions which are not traceable to these underlying factors. From them arise insufficient schooling, ignorance, poverty, child labor and unwise employment of the parents. To them may be traced bad housing, feeble-mindedness, hereditary physical defects and crime; drug addictions, disease, bad feeding, malnutrition and exposure. Poverty, ignorance and destitution are frequent factors in all kinds of ill health. Should ignorance be enlightened and destitution made impossible? Pretty far from public school pathology? Yes and no! Far from the palliative treatment of this disease of social organization, far perhaps from the *direct health* treatment of it, but very near the economic and social heart of the cure of the great socio-health defects of which preventable disease among children is one.

2. *Suppression versus Construction.*—Health work in the schools may per-

haps be outlined from one point of view somewhat as follows:

(a) The detection, isolation and suppression of communicable disease;

(b) The discovery and correction of non-communicable physical and mental defects;

(c) Education in hygiene to prevent the development of communicable and non-communicable defects;

(d) The encouragement of strength and resistance to infection and the development of healthy normal bodies and minds.

In great part the types of health work we have been used to in the past have been of an eliminative, suppressive character. In school hygiene, for instance, there was first attempted the control of communicable diseases. This was health work of a suppressive character. Of late, however, we have been giving increasing attention to the more constructive phases of school hygiene. We are now attempting, though indeed with grotesquely inadequate measures, the elimination of non-communicable defects, the prevention of improper and insufficient feeding and the resultant malnutrition by the establishment of lunches in the schools—an experiment in itself of great social importance, significant as a demonstration of the economy and social value of group feeding. We are now going still further in the use of prophylactic dental clinics, dental nurses, to say nothing of the comprehensive program for physical training and development.

This constructive element in modern health work is exceedingly promising and is to be found in all phases of health activity. In the factories, for instance, where industrial dusts and disease are associated, not only are shower baths provided where the dusts may be washed off and industrial disease *suppressed* but there is added to the equipment bathing pools where health and resistance to industrial disease may be *constructed.*

Thus modern, constructive, creative, health work, presents a previously lacking social content. In school work it indicates the realization of the social value of healthy children. It is attempting there to lay a firmer physical foundation upon which the world may hope to see constructed a finer social state. It realizes that without a physically sound substratum social evolution is bound to be abortive. It is from this point of view that school health work is of very high significance when socially interpreted.

3. *Education, the Social Instrument.*—The foundations of health education must be laid in the schools. This is of particular importance in the light of our modern conception of health work. In our more advanced communities we scarcely need speak longer of *public* health work. It is possible now to drop the word "public" and to talk of health. This means that personal health, personal hygiene, is to be the keynote of modern sanitation. The schools are, beyond comparison, the most valuable instruments for the instruction of society's members in the matters of hygiene.

A great deal is said regarding the use of the school as a social centre. Indeed, there is seen on all sides the increasing use of the schools as centres

for community life and in no field is this development of greater importance than in the dissemination of knowledge regarding infection and health preservation. Special literature on various municipal health problems is being constantly prepared and presented to the children. Health days of all kinds are set aside for special observance. Such potential channels for education as the school lunch system, not designed originally for special educational use, is now employed for the enhancement of knowledge regarding sanitary, dietary, economic and culinary food values. If the schools are to serve a further socio-hygienic purpose every effort must be made to bring to perfection the physical equipment so that it may serve during school hours as an example to the children of the essentials of a hygienic and sanitary environment. Finally if our educational system is to perform the most fundamental social usage to which it can be put, it must instill into the minds of the future citizens a more socialized conception of the purpose of existence and a greater sense of social responsibility. During the school period there must be created a conception of the purpose of living which shall make possible in the future the supplanting of the idea of personal gain by the ideal of social service.

4. *The Social Background of School Hygiene Work.*—While it is customary for us to classify disease, according to its origin, as environmental or constitutional, one can, with justice, say that all of the former and most of the latter class are of distinct social origin, depending upon social habits and customs for their transmission or development and to be combated by social instruments. This conception of disease is certainly applicable to the affections of school life and as the child is the ward of the state, society has here a most urgent obligation to maintain healthful conditions. This society is doing to the extent to which there has been developed a sense of social responsibility. There is the additional necessity for this basis of health in the schools if the educational system is to bear its best fruits. A physical foundation is essential to the successful and economic working of the educational mechanism. The pouring of pure wine into cracked vessels was ever a wasteful and futile process. An active social consciousness will make possible the avoidance of such tremendous wastes as are involved in an educational system which turns out annually, because it refuses to use well known and tested preventive measures, an army of incompetents, misfits, physical defectives and sufferers from mental inadequacy, all of whom will serve society abominably and exactly after the manner in which society has met its own obligations to them.

What is the value of and the motive force for all the health work, in school and out of it, that is now being undertaken? One can readily see that it has far reaching, social, economic and moral phases. Evidently it is an attempt to make sanitation universal, to eliminate preventable disease, to perfect the social and individual health status. It means increased human efficiency, greater earning capacity, a normal social life and a better physical

foundation for sound, social and spiritual growth. It indicates that society is attempting to meet its social responsibility by protecting the whole of human kind from the menace of its defective members. It recognizes that one of the keenest socio-sanitary indices of a community's life is the care which it takes of its future citizens.

Is it done, however, purely for the sake of the physical and mental health which will result? Is a pig in a clean pig pen any less a pig? Is modern society striving for cleanliness, decency, and health solely because they are worth while ends in themselves? Is the fullest meaning of constructive health work to be found in its social, political and ethical interpretation or does it have an even more fundamental significance? Is it not true that a healthy individual and a healthy society are the only adequate means or instruments through which may come a more perfect expression of the conscious life in the universe? The public health is not only inevitably entangled in the problems of economic readjustment and of social growth, but it is of intimate significance to both individual and social spiritual evolution. The health of the people, the physical and mental welfare of the nation and of the World are essential to the higher manifestation of conscious life, the *Elan Vital*, striving for a more perfect expression through the medium of human-kind.

PRINCIPLES OF ADMINSTRATIVE CONTROL OF COMMUNICABLE DISEASES IN LARGE CITIES.

JOHN S. BILLINGS, M. D.,
Director, Bureau of Preventable Diseases, Department of Health, New York City.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 10, 1915.

Doctor Billings discusses in this paper some of the subjects which must always be taken into consideration in controlling the communicable disease situation in any community—among these are the following: Registration, Recognition, Termination, Hospitalization, School Exclusion, Disinfection—and the Education and Instruction of Profession and Public.

THE following attempt to outline the principles of administrative control of communicable diseases in large cities, is based on the experience of New York City for the past twenty years. The credit for the first steps towards bringing such control into accordance with modern views, must be given to Dr. Hermann M. Biggs, then Bacteriologist of the Department, later its Medical Officer, and now the Commissioner of Health of New York State. Thanks to his unwearying personal efforts in the face of countless obstacles and discouragements, there were introduced the notification and registration of tuberculosis, along practically the same lines as at present, the laboratory diagnosis of tuberculosis and diphtheria, and the use of diphtheria antitoxin.

Many of the present procedures in New York City are the result of laboratory experiment, and of trial among small groups of persons before being generally introduced. The more important principles which have proved of value and have been adopted, may be grouped under the following heads:

Authorization.—Health authorities must have legal warrant for the various steps to be taken to preserve and protect the public health. In many communities the necessary laws and regulations must be adopted individually and one at a time by the legislature. This is a slow and cumbrous process, not calculated to give the best results, particularly in case of emergency during a sudden outbreak of an infectious disease. The granting to the health authorities the power to make their own regulations, which have the force of law, has been found the best working arrangement. In New York City these laws and regulations constitute the Sanitary Code, which can be amended and added to at any time by the Board of Health. The power thus granted might at first glance seem too large, but no Board has ever availed itself of this power in excess, nor abused its privileges.

Notification.—Full and complete knowledge of the number and location

of the cases of the various infectious diseases is of the first importance. Such notification must be complete and prompt. There should be penalties for failure to comply with notification regulations, which should be strictly enforced. Early reports are a *sine qua non*. Many of the infectious diseases are most contagious during the preliminary period before they are recognized, and even with the earliest possible diagnosis and report, most of the damage has already been done. So that in the more serious diseases, such as scarlet fever and diphtheria, physicians and institutions should be required to report their cases immediately by telephone, following up the same by a written report. The best method for checking and controlling the registration of cases of infectious disease is, of course, the comparison of all reports of deaths from such diseases with the roster of living cases.

As an aid to obtaining complete and satisfactory registration of infectious diseases, free laboratory examinations are of the greatest value as furnishing a *quid pro quo*. The most potent factor in overcoming the objections of the medical profession to the notification and registration of pulmonary tuberculosis was the free examination of sputum for physicians by the Department. The aid in diagnosis and treatment obtained thereby soon came to outweigh any opposition based on purely ethical reasons. In the same way the free examination, by the Department of Health, of cultures for diphtheria, of blood and excreta for typhoid fever, of spinal fluid for cerebro-spinal meningitis, and of blood for the Wassermann reaction in syphilis, have been of the greatest assistance in securing the registration of those diseases.

Registration.—The actual methods of registration of cases of infectious disease should be simple yet flexible. The recording of diffuse and detailed information as a matter of routine, simply because it can be obtained, is particularly to be avoided. The histories and records should be as simple as possible, and call for only such information as is needed for the proper supervision of the cases. If the city is divided into a number of districts, there should be a central record of all cases to identify cases disappearing in one district and appearing in another. This applies chiefly to cases of tuberculosis.

Recognition.—There should be a corps of physicians acting as diagnosticians, familiar with the signs and symptoms of the various infectious diseases, and with the various procedures to be followed in the disposition of cases, and trained in the carrying out of the various preventive immunizations and vaccinations, and in obtaining specimens of blood and spinal fluid for laboratory examination. Provision should also be made for the careful investigation, by trained observers, of epidemics and outbreaks of infectious diseases. This applies particularly to typhoid fever. Every case of this disease should be studied as if it were the starting point of a city-wide epidemic. The typhoid situation throughout this country has improved greatly of late years. Waterborne epidemics are now comparatively

rare, and, with the introduction of general pasteurization of milk supplies, the same is becoming true of milk-borne outbreaks.

Typhoid carriers have moved to the center of the stage, and the thoughts of all health authorities are occupied as to the best methods for their recognition, supervision and control.

Supervision.—In order to properly control infectious disease in large cities, each case should receive individual consideration and supervision. To best accomplish this, such cities should be divided into districts, each with its central office in charge of a chief physician, having under him a diagnostician and a field force of nurses. In all large communities, nurses are replacing physicians for routine inspectorial and supervisory work. A good physician is too expensive an article for general field work, and should be assigned only strictly medical duties calling for expert knowledge as to diagnosis and treatment.

To secure successful supervision of infectious diseases, the fullest and friendliest coöperation with the private physician is of the first importance. Given a capable, reliable physician, willing to take the responsibility for preventing the spread of the disease to others, the health authorities need do little more than second his efforts. Every possible use should be made of coördinate branches of the city government. Only too often will the police, health, charities and hospital authorities be found to be not only duplicating their efforts, but to be actually hindering one another. The coöperation of the police should particularly be secured. The policeman on his beat is the officer of the city coming into closest contact with the public. He is the one to note nuisances, and, witting or unwitting violations of sanitary regulations, and to ensure their discontinuance. Such a system of coöperation has recently been put into effect in New York City, with most satisfactory results.

Prevention.—Of prime importance in connection with the prevention of infectious diseases are municipal clinics. Of these, the tuberculosis clinics are the best known; there should be one in every district, each with its staff of trained physicians, the field nurses, familiar with the patients at their homes, serving as clinic nurses. Similar clinics for the treatment of persons exposed to rabies, for diagnosis and advice in venereal diseases, etc., are desirable. Theoretically, most of the various preventive measures against the spread of infectious diseases should be carried out by private physicians, the health authorities going no further than to furnish the necessary material. As a matter of fact the municipality will probably always have to do a certain amount of preventive medical work.

Again, it is often advisable, in order to introduce valuable new procedures, for the authorities to have the same done by its physicians until the medical profession and the public realize their value and they come to be recognized as routine procedures, when their performance can be turned over to the medical profession. This was the case in New York City as

regards diphtheria. A corps of inspectors for the free administration of diphtheria antitoxin and the performance of intubation was organized in 1895. It continued in existence until 1913, when it was felt that the education of the public was complete, and such free service at the patient's home was discontinued. The Department still administers diphtheria antitoxin, but only to patients without physicians and about to be removed to its hospitals. Every practising physician should be able to administer the various antitoxins, sera and vaccines as readily as he can use a clinical thermometer.

Among the various preventive measures to be provided by municipalities, are vaccination, immunization against diphtheria and typhoid fever, the treatment of rabies, whooping cough, etc.

Termination.—With the steady advance of our knowledge regarding infectious diseases, the methods of termination of cases have become more logical and satisfactory. Diphtheria furnishes an excellent example of this, laboratory examination telling us when danger of infection of others is passed and quarantine can be raised. No persons recovering from typhoid fever should be discharged from supervision and allowed to resume their occupations until examination of the excreta shows that typhoid bacilli are no longer present. The quarantine period in measles has been reduced from two and three weeks to five days, thanks to the investigations of Anderson and Goldberger. When we know and can demonstrate the presence or absence of the causative agent in cases of scarlet fever, our control of that disease will be greatly inproved.

Hospitalization.—The segregation of cases of infectious diseases in isolation hospitals is no longer looked upon as the ideal method for their control. It is probable that eventually the old "contagious disease hospitals" will be done away with, and that all large general hospitals will care for the cases of infectious disease occurring in their districts. There must, of course, be institutions for the care of cases in which the necessary precautions for the protection of others cannot or will not be observed.

Day camps and day nurseries are valuable adjuvants, and their facilities should be available in all large cities. It is probable that the best means of reducing the death-rate among infants from whooping cough, would be the removal of all infants exposed to infection to such day camps.

School Exclusion.—The principles of control of disease in schools in New York City will be dwelt upon by another speaker. An important point to be borne in mind is the avoidance of unnecessary loss of school time. This is particularly true in cities such as New York, where children must present evidence of a certain period of school attendance before being allowed to begin work. Authorities now hold that the vast majority of cases of infectious diseases are transmitted by direct contact. Insusceptible children and teachers, *i. e.*, those who have had the disease in question, rarely transmit infection and should

not be excluded from school when cases occur in their homes. Such exemption from exclusion will be greatly facilitated if the municipality supplies every child that has suffered from an excludable infectious disease, with a certificate to that effect. This procedure has been tried in New York City for almost a year with excellent results.

Disinfection.—Terminal disinfection no longer holds a prominent place in the control of infectious diseases, for the reason that by the time the infective agent has disappeared from the person of the patient, it has long since disappeared from the premises and surroundings. Terminal fumigation in cases of infectious diseases has been abandoned by the Department of Health of New York City for two reasons: First, because, as stated above, there is probably little or no contagion to destroy, and, secondly, because the process itself, under ordinary conditions, has but limited disinfecting powers. Exception is made as regards sulphur fumigation for vermin. Better and more effective disinfection can be secured by means of thorough cleaning in conjunction with fresh air and sunlight, nature's own disinfectants. In many instances premises should be renovated, *i. e.*, re-papered and re-painted. In New York City this is done by the owner upon receipt of notice from the Department of Health. Thousands of such renovations are done yearly, the great majority voluntarily.

Education and Instruction of Profession and Public.—The principles of the control of infectious diseases along these lines by circulars, leaflets, weekly publications, lectures, moving picture shows, etc., will be described by another speaker.

Conclusion.—In conclusion a word should be said as to nomenclature. The words "contagious," "communicable" and "infectious" are used in various cities and states to indicate sometimes the same thing, and again, different classifications of diseases.

In New York City, diphtheria, scarlet fever, smallpox, measles and other acute exanthemata, were formerly classified as "contagious," while tuberculosis, typhoid fever, cerebrospinal meningitis and acute poliomyelitis were classified as "communicable" and "very readily communicable." Of late years these terms have been abandoned, and all such diseases are classed under the one heading, "infectious." The only sub-classification adopted has been that of "major infectious diseases" for those calling for investigation and supervision by the Department, and "minor infectious diseases" for those not so investigated. This last sub-division has been adopted purely for the sake of convenience.

It would be well could some uniform agreement be reached in this matter. On all such broad general principles, health authorities should, as far as possible, be in agreement.

THE USE OF THE UNEMPLOYED IN THE FIELD OF SANITATION

James F. McCrudden,
Philadelphia, Pa.

Read by title before the American Public Health Association, Rochester, N. Y., September 7, 8, 9 and 10, 1915.

Unemployment and under employment are topics that the average health officer pays little attention to. No one will deny the significance of unemployment when considered solely from the public health point of view. Men and women who are out of work or who are only working part time necessarily are unable to buy proper food and shelter which are so essential for their physical well being. Mr. McCrudden, in this paper, tells in an interesting manner how a number of unemployed men were given work through the Health Department of the City of Philadelphia. Not only did they benefit themselves but the work they did was a direct benefit to the entire community. This is a subject that health officials generally might well give more attention to.

IT MAY be safely and consistently stated that the problems which confront the health officers of the larger cities of this country are very nearly identical, and that many conditions present themselves for correction to which the usual processes are difficult to apply.

Reference is made particularly to the petty nuisances so often presented by the taxpayer which cannot be abated without the use of money, and which demand so much of the attention of the health official.

The essential feature in the solution of such problems is the fact that the nuisance must be speedily abated and the necessary work performed promptly for the correction of the insanitary condition.

Often the complicated process incident to the performance of work of this character requires more labor than the actual doing of the work itself. Mention may be made of the problems of the private alley; the vacant lot, especially where owners are inaccessible, or not definitely known; mosquito breeding places, which require but little labor in their abatement, and the determination of the nuisances which are caused by water entering cellars or basements.

The demands of the taxpayer are usually more urgent and persistent for the abatement of conditions such as these, than any clamor for putting into effect preventive measures conforming to modern ideas on sanitation.

In the absence of sufficient funds, many of the smaller and more troublesome nuisances must of necessity give the health officer more or less bother. Of course, reference is made particularly to the correction of nuisance which must be controlled entirely by the expenditure of money and cannot be handled by prosecution.

Frequently nuisances and insanitary conditions may be properly laid at the

door of the municipality itself. Others exist on property which is in litigation and subject to restraining orders. Some are properties legally acquired by a municipality but with no funds for improvement. The problem of how to best handle such conditions has always been a troublesome one, and consequently the health officer must find the best available methods of improving sanitary conditions within the limited means at his disposal.

In these days of city planning and town development, and with the efforts being put forth for the encouragement of civic pride in our citizens, we have confronting us these apparently everlasting conditions in our cities. As an example, when the ownership of vacant land is divided into thirty-sixths, or some other ridiculous fraction, or when, as in many cases, a property is already in the hands of the sheriff, the difficulty in abating a nuisance existing thereon is self evident. To convert an insanitary piece of ground into a place that will appeal to the esthetic sense is to effect a civic improvement. In some cities, there are many parcels of vacant ground known as "no man's land," where ownership cannot be determined nor responsibility placed.

It is highly important that the sanitary division of any department of health should be supplied with an ample labor force in order to allow the health officer to take prompt and efficient action in the abatement of nuisances. The amount of good accomplished by the employment of such a labor force will more than offset the cost of its maintenance. This has been proven many times.

The problem of the use of the unemployed in the field of sanitation is one which has seldom presented itself to the Health Officer in a co-related form. During the past winter, many of the larger cities appropriated from their general treasury a sum of money which was thought to be sufficient to relieve some of the economic conditions which always present themselves during "dull or hard times," and added to this were those contributions so generously made by the charitably inclined.

Among the difficulties encountered by the boards or committees which handled such funds for emergency aid use, the problem arose of how best to furnish employment to be paid for from such a treasury.

The department of health or sanitation in any large city can without difficulty employ as many laborers as may be assigned, and surely there is nothing that can be of more advantage to the general community than the steps taken by health authorities to make safe and to prolong human life.

In Philadelphia, money was appropriated by city councils, duly approved by the Mayor and given in charge of the Director of the Department of Public Health and Charities, and an Emergency Aid Committee. It was the duty of this joint committee to solve the problem and dispose of the funds in a proper and legitimate manner.

The difficulty which is often experienced in securing employment for men who are to be paid out of funds so

appropriated was very easily overcome by the assignment of more than fifty per cent. of the men employed, to the Department of Health, with the result that very many insanitary conditions in the city were corrected and the community was inspired with a spirit of civic pride which will result to the ultimate benefit of the city itself.

Without doubt, there is sufficient work in the field of sanitation in the larger cities of this country to thus employ men. The classes of nuisances cited are typical of every city. No work was performed by these men who were assigned to the Department of Health and Charities, which could be properly chargeable to the property owner.

It was from the funds of the taxpayer that money was secured for the employment of these unemployed and consequently it was but just and reasonable that the taxpayers should receive some return from such expenditures.

The men assigned were divided into three corps in charge of a supervising sanitary inspector, and were employed on an eight-hour day basis, wages being paid weekly. An amount per hour was paid the men, sufficient to give them a livelihood, yet at the same time small enough to insure a proper determination on the part of these men to secure more profitable employment.

Not being able to determine accurately the length of time these "unemployed" would be at the service of the Health Department, it was deemed most important to accomplish that which would be of the most benefit to the families of men who sought Emergency Aid Relief.

Much ground has been purchased recently by the city of Philadelphia for playground purposes, awaiting future appropriations for their development into a proper place for the pastimes of children.

Much of this vacant ground was under the jurisdiction of the municipal government, and, as there were no funds appropriated for proper maintenance, there arose insanitary conditions similar to and highly comparable with any other piece of vacant ground in the well built up section of the city.

The men furnished to the Health Department were turned into these places first, and every available method was adopted to convert such vacant ground into a sanitary playground, to be used during the summer months. Of course, this did not include the purchase of any apparatus or fixtures, but only included sanitary development.

Thousands of cubic yards of refuse and filth were gathered and collected from these lots and vacant pieces of ground. Refuse material was removed and in many cases these lots were turned into neighborhood recreation centers, tennis courts, and other places of amusement.

There were small, narrow alleyways, unpaved and with divided responsibility as to ownership, where the Department of Health was compelled to abate nuisances and lien the property for costs. Knowing that it would take considerable money to properly grade and pave all of the small alleys in the older section of the city, and there

being no funds available, such conditions were allowed to remain from year to year. The men assigned and paid from the emergency aid funds were turned into these alleyways and these places were put into such condition as had not been known for a great number of years previous.

Where such civic improvements were made, a spirit was imbued in the citizens of the neighborhood affected. Voluntary sanitary inspectors were assigned, and a disposition and inclination to insist upon the proper sanitary maintenance of such places was resolved upon.

Mosquito breeding places on property owned by the city and in the Park were given attention and many miles of ditching were made. The shores of the water courses and ditches were raked and many mosquito breeding ponds were filled with the proper material.

Vacant properties that had been acquired by the city through delinquent taxes were taken care of and put in sanitary condition, and many that were involved in litigation which restrained the Department from taking action, were given attention, to the benefit of the neighborhood surrounding. The city hospitals were placed in position to do many of the little things which go undone because of the importance of greater things. This, of course, does not apply to the bettering of sanitary conditions, but was the means of placing many small improvements which would have involved the expenditure of much money had not this force of men been available.

The grading and proper maintenance of the lawns, and work in and around the boiler rooms, the construction of ditches, the laying of terra cotta drain pipes, the laying out of roadways, repairing of fences and buildings, painting, carpentering, etc., was included in the work performed at the hospitals.

These men, being in charge of experienced supervising sanitary inspectors, were able to accomplish much work and at the same time to let the tax-paying citizen feel that some return was being given for the money which had been appropriated.

The fact that the men did not remain a great length of time on the payroll of the Emergency Aid Committee, but resigned as soon as a more congenial and better paying work was presented, proved that the financial plan was a good one, and that very nearly all of the unemployed were properly taken care of.

The class of workmen furnished for this work of sanitation was above the average. There were included stonemasons, plumbers, carpenters, electricians, painters, bricklayers, machinists, cement finishers, blacksmiths, and many high class laborers.

A complete census was made of the entire force and as a result the men were assigned to work which they were most capable of performing. This census gave the Department some very interesting data, such as the name, address, nationality, religion, citizenship, length of time unemployed, wages received when employed, occupation or profession, and the approximate amount of wages lost during the time of unemployment.

A complete cost account was kept,

thus enabling the Department to file with its records new cost data. It gave also a very accurate estimate of the cost of abating various classes of nuisances.

Notices printed in colors which were more or less attractive were posted on properties where work had been performed, giving warning that any violation of sanitary laws would be met with immediate prosecution.

The Police Department rendered efficient coöperation by the enforcement of the law and by reporting to the Health Department immediately any flagrant violation of the same.

A systematic and efficient follow-up system was inaugurated and, with the coöperation of the citizens, a careful watch is to be kept to prevent the creation of insanitary conditions.

There is a feeling that the city has been greatly benefited by these measures and that civic pride has been developed in many neighborhoods. There appears to be no doubt that the knowledge of the accomplishment and correction of an insanitary condition acts as an encouragement to the citizens to see that such improvements remain permanently.

THE PREVENTION AND ARREST OF DISEASES OF THE CARDIO-RENAL-VASCULAR SYSTEM.

EUGENE LYMAN FISK, M. D.,
Director of Hygiene, Life Extension Institute, Inc., New York, N. Y.

Read before the General Sessions of the American Public Health Association, Rochester, N. Y., September 9, 1915.

DURING recent years abundant evidence has been presented demonstrating an increasing mortality in this country from chronic diseases of the vital machinery. Even though no such increase were apparent, the fact that in 1913 approximately 130,000 citizens of the United States between the ages of 30 and 60 years died of these maladies evidences a tremendous loss of life from preventable or postponable disease.

This mortality also reflects widespread degeneration, impairment and premature decay. Present knowledge does not enable us closely to approximate the ratio of impairment to the mortality, but recent examinations by the Life Extension Institute of large groups of supposedly healthy wage-earners in various walks of life, show that such impairment is actually widespread, and reaches down into the early years of life.

For example: Among well-conditioned industrial workers (average age 32) in the Ford Motor Company, in Detroit, we found more than 50 per cent. presenting some degree of arterial change, and more than 45 per cent. showing varying degrees of albuminuria, glycosuria, or other inportant urinary impairments.

In commercial groups in New York City (average age 27) we found 42 per cent. showing varying degrees of arterial change, and 40 per cent. showing albuminuria, casts, glycosuria or other important urinary impairments.

I have analyzed and compared these findings in detail in an address before the section on Vital Statistics to which those who are interested are referred for the full figures and for information regarding the technique, standards and methods observed in eliciting this evidence. Every possible check has been applied to the evidence and it has carefully been considered by members of our Hygiene Reference Board who are specially qualified to pass upon it.

Conceding that premature physical decay is one of the most pressing public health problems of the hour, it is natural that we should seek some principal cause for the encroachment of these chronic maladies that are responsible for it. It is true that the mortality trend in this country suggests the possible existence of some special influence or group of influences operating unduly to strain or injure our vital organs. Mere civilization cannot account for the increase in these maladies, as other highly civilized countries do not show the same trend.

The survival of the unfit is not a satisfying explanation, as these chronic diseases of vital tissue and the ac-

companying mortality at the ages when their fatality is most manifest are decreasing in countries where the saving in life in infancy and childhood has been greatest. Furthermore, the increasing death-rate from cardio-vascular and renal disease is not confined to any one class in the population, but seems to be a widespread and general condition, affecting all classes. It is quite possible that the peculiar form of our civilization, its rapid development, and the free and liberal habits of living engendered by great national prosperity, together with the strain and struggle of all classes, high or low, for still greater prosperity and more lavish expenditure, are conditions fundamental to the special causes that immediately operate to break down the vital machinery of our bodies. It is also possible that there is some biologic factor at work, independent of individual physical condition or environment.

Whatever the primary and fundamental causes may be that sap our vigor and bring about premature decay, we may be fairly certain that they could be excluded by the practice of personal hygiene and by rational eugenics. By leading a hygienic life, we may escape the operation of these forces, whatever they may be, that seek to destroy us.

There is a certain myth about the "seven ages of man" that modern science should dissipate. Think of the priceless asset of a healthy well-developed body at age 30, and then reflect how soon this body usually begins to settle down into those traditional ages marking the progress of decay. This time-honored toboggan-slide to senility is not a necessary movement. There is, in fact, no proof that this decay arises from within, as the result of physiological movement toward a fixed and predetermined physical destruction within a definite time limit.

The inherited resistant quality of body cells is, of course, an important factor, as physical decay arises from cell injury, from trauma, poison, infection, or over-work. Mayo has well stated that in most cases disease is the result of infection. Life is a constant struggle with microörganisms. We now know that many chronic diseases, such as so-called chronic rheumatism, rheumatic gout and other chronic joint changes, ulcer of the stomach, organic heart and kidney affection, are caused by low grade infection working slowly and insidiously. Acute rheumatism, which is well known to be a frank infection, often seriously damages the cardio-vascular system. Such conditions were formerly ascribed to uric acid, lactic acid, to faulty metabolism, damp air, red meats, and various other agencies, contributory perhaps but not the immediate and principal cause of such maladies. We now trace them down in many cases to infection, traveling from some focus in the body—tooth sockets, nasal cavities or accessory sinuses, seminal vesicles, or other favorable culture stations for bacteria. The infective organisms, chiefly of the pneumococcus - streptococcus group, block the small arteries in the various regions of their selection and establish a vicious pathological circle of lowered vitality, lowered resistance in the part affected coincident with bacterial at-

tack. It is important to recognize the actual physical destruction caused by such organisms as the pneumococcus-streptococcus group, entirely apart from the protein poison that they set free in various ways as pointed out by Vaughan. Undoubtedly this protein poison may seriously injure the cells forming the coats of the arteries and other vital tissues. The freedom with which these microörganisms not only travel through the blood stream, but migrate through the tissues and penetrate the organs of the body, and the fact that the physical condition under which they are cultured in the primary focus, whether tooth socket, accessory sinus or middle ear, determines in large measure the selective affinity of these organisms for special regions, such as the stomach, heart, kidneys, appendix, gall bladder, etc., are among the most startling revelations of modern pathology. The degree of cell resistance to such influences is, of course, often an inherited quality.

It would seem, therefore, that the first requisite in combatting the progress toward physical decay is to eliminate all infective foci from the body. This does not mean to wait for toothache, headache, fever, or other announcement of such conditions, but to begin in infancy to regularly inspect the body from head to foot, especially those regions that are ideal culture tubes for bacteria, and to prevent the development of these foci of disease. This is the simple, elementary obvious first step in the practical work of prevention after the individual lands upon the earth.

These physical examinations should be conducted with great thoroughness for the purpose of uncovering not only physical defects and impairments, but foci of infection, especially in the mouth, nose and throat.

The public health officer, while striving to eliminate an occasional focus in the community of typhoid infection, should also labor to eliminate the foci of streptococcal infection that exist in millions of mouths throughout the country.

The Institute's examinations suggest the possibility of pyorrhea, or so-called Rigg's disease, being a communicable disease. Pure mouths are just as important as pure food and pure water.

Such examinations should also be supplemented by close inquiry into personal and family history and living habits, and the individual—what he is, what he does, and what he leaves undone—studied as a whole, and guidance given him as to how to live.

Physical examination is, however, by no means an all-sufficient measure. It is impossible to keep the human body sterile, so we must anticipate that in spite of periodic inspections bacteria will occasionally gain a foothold in intervals of lowered resistance, due to fatigue, exposure and various forms of strain or poisoning.

To raise the body to its maximum resisting power is, therefore, equally important work. Here we enter a broad field, that not yet thoroughly explored country, of eugenics and of personal hygiene. I realize the complexity of the problems connected with eugenics, and the limitations of our knowledge on this subject, but I rec-

ognize a clear duty to prevent, by every possible means, the mating of the obviously unfit. The fact that we may lose an occasional poet does not matter. The reeking mass of pathology, of drunkenness, of insanity, of laziness, inefficiency, crime and immorality that burdens humanity is too high a price to pay even for a Shakespeare or a Shelley. The human race may well take its chances of securing its literature, poetry and art from sound minds and sound bodies. There is too much pathology in modern literature, anyway, literary infection quite as insidious and deadly as the pneumococcus-streptococcus group of material microörganisms.

Having secured the birthright of a reasonably good heredity, personal hygiene must then be enlisted to develop and improve this birthright at the highest possible rate of interest.

To teach the people how to live is a problem of increasing importance to those who are working for the public health.

As a help to the health officers and others who desire to extend this work, I submit a list of topics and suggestions derived from the literature of the Institute and from its manual "How to Live":

AIR.

Housing.

Windows
Features of Ventilation
Air and Catching Cold
Drafts
Window Boards
Air Fans
Heating Systems
Cool Air
Dry Air
Humidity
Freshness
Tobacco Smoke
Dust
Bacteria
Sunlight

Clothing.

Porous Clothes
Air Baths
Tight Clothing
Shoes
Cottons, Linens, Woolens
Color

Outdoor Living.

Out-of-door Air
Dampness
Outdoor Schools
Outdoor Recreations
Occupations

Outdoor Sleeping.

Tuberculosis
Well Persons
Vital Resistance
Night Air
Protection from Cold
Sleeping Tents
Outdoor Tents

Deep Breathing.

Breathing Exercises
Muscular Exercise
Singing
Mental State

FOOD.

Quantity of Food.

Calories
Favorable Weight
Overweight
Accessories
Underweight
Diet in Middle Life
Diet in Hot Weather
Brainwork and Eating
Eating when Fatigued

Protein Foods.

Protein, Fat and Carbohydrate
Proportion of Protein
Human Milk
Excessive Use of High Protein Foods
Injuries from Over-Abundance of Protein
Animal Protein

Hard, Bulky and Uncooked Foods.

Hard Foods
Bulk Versus Concentrated Foods
Raw Foods
Vitamines
Raw Milk
Disinfeetion
Aeids and Inorganic Salts

Thorough Mastication.

Prolonged Relish of Foods
The First Three Mouthfuls
Evils of Insufficient Mastieation
Careful Tasting
Increased Enjoyment
Choosing Foods
"Good" and "Bad" Foods
Salt, Pepper, Spices
Sugar and Candy
The Digestibility of so-called Indigestible Foods
Avoidance of Fads
Nccessity of Medieal Examination

Poisons.

Constipation.

Use of Sour Milk
Evidences of Injury
Retention of Body Wastes
Water Drinking
Laxative Foods
Bran and Agar Agar
Mineral Oils
Avoiding Drugs
Enemas
Massage of the Colon
Number of Defecations
Establishing Proper Habits

Posture.

The "Consumptive Stoop"
Breathing and Posture
Standing and Walking
The Feet
Toeing Straightforward
Chairs
Sitting
Posture in Children
Posture and Character

Poisons from Without.

Habit-Forming Drugs and Patent Medicines
Reducing the Habit
Alcohol and Infectious Diseases
Tobacco
Germs
Cold and LaGrippe Germs
Tuberculosis Germs
Mosquito-Borne Malaria and Yellow Fever
Typhoid Free Water
Typhoid Free Milk
The "Typhoid Fly"
Other Vermin
The Hookworm
Sex Infection

Teeth and Gums.

Mouth Dangers
Dental Decay
Pyorrhoea
Systematie Injuries from Mouth Infection
Focal Infeetion
Lowered Resistance
Saving Teeth
Keeping the Mouth Aseptic
Over-Dentistried Teeth
Teeth and Infectious Diseascs
Irregularities of Teeth
The Temporary Teeth
Vigorous Use of Jaws
Periodic Examination
Cleansing
Kind of Brush
Tongue Brushing
Dental Floss
Tooth Powders and Pastes
Emetin
Alkaline
Food Acids
Erosion
General Hygiene

Activity.

Work, Play, Rest and Sleep.

Need of Work
Prevention of Overstrain
Working Hours
Monotony and Interruption
Eyestrain
The Physical Worker
The Brain Worker
A Daily Rhythm
Muscular Exercise
Outdoor Exercise in Winter
Enthusiasm in Exercise

Mechanical Home Exerciser
Stimulating Heart and Lungs
The Greek Ideal
Injuries from College Athletics
Possibilities in Exercise
Exercise after Meals
Exercise of Mind, Will and Emotions
The Avocation
Enjoy Recreation
Pleasures of Walking
Games
Dancing
Card Playing
Suicidal Amusement
Relaxation
Bathing and Swimming
How to Induce Sleep
Cleanliness
Perspiration
Hours of Sleep
Eating before Retiring
Place of Sleep
Character of Thoughts
Morbid Literature
Pillows
Type of Bed

Serenity and Poise.

Influence of Health on the Character
The "Cause"
Mental Rewards from Health
Influence of the Mind on Health
Physical Manifestations
The Demands of the Mind
Hypochondriacs
"Mind Cures"
Rejoice at Things as They Are
Serenity an Art
One Day at a Time
The Hurry-Habit
Religion and Philosophy
Control of Attention
Making up One's Mind
Intensity of Desires
Religion of Healthymindedness
The Habit of Happiness

Hygiene in General.

The Fifteen Rules of Hygiene.

The aids to health discussed in the preceding divisions may be summarized in specific formulas classified under the four heads, Air, Food, Poisons, and Activity, corresponding to the four chapters; and under fifteen sub-heads, corresponding to the fifteen sections.

The Rules of Hygiene have been summarized by Prof. Irving Fisher after conference with our Hygiene Reference Board, as follows:

Air.

1. Ventilate every room you occupy
2. Wear light, loose and porous clothes
3. Seek out-of-door occupations and recreations
4. Sleep out, if you can
5. Breathe deeply

Food.

6. Avoid overeating and overweight
7. Eat sparingly of meat and eggs
8. Eat some hard, some bulky, some raw foods
9. Eat slowly

Poisons.

10. Evacuate thoroughly, regularly and frequently
11. Stand, sit and walk erect
12. Do not allow poisons and infections to enter the body
13. Keep the teeth, gums and tongue clean

Activity.

14. Work, play, rest and sleep in moderation
15. Keep serene

"The application of these rules to one's daily life must be varied with each individual. The most practical method is for the individual to begin the improvement he would seek by constructing a typical day's program in which time is provided for, say, breathing and other exercises in bed, bath, toilet, walk to business, meals, amusement, etc., with special notes and memoranda as to the particular faults of omission and commission to be corrected. One might also, as Benjamin Franklin records in his autobiography, keep a daily record for a week as to how nearly the program is lived up to. By dint of such and other stimuli, the transition in habits can be made, after which the rules cease to be 'rules,' as carrying any sense of restriction, and become automatic like putting on or taking off one's clothes."

The Unity of Hygiene.

The Rules Interrelated
Specialists
Remote Effects of Ailments

Popular Delusions
So-Called "Overwork"
An All-Round Régime

OBSTACLES TO HYGIENE.

Effort of the Will
Cost of Good Health
Missionaries from among the Poor
Cost of Foods
Repaid Cost
"I have no time"
"Too much trouble"
Simplicity of Hygienic Living

THE POSSIBILITIES OF HYGIENE.

The Preventibility of Disease and Death
Impairments Unsuspected
Minor Ailments
The Personal Equation
Over Confidence
Possible Health Attainments

HYGIENE AND CIVILIZATION.

Natural Adjustments Upset
Civilized Housing
Houses Unhygienic
Effects on Different Races
Clothing Unhygienic
Compensation for Civilization
Soft Foods Unhygienic
Concentrated Food Unhygienic
Hurry Unhygienic
Use of Flesh Foods
Other Evils of Civilization
Shortened Human Life
No Return to Nature; must Live in the Present

THE FIELDS OF HYGIENE.

Public Versus Individual Hygiene
Coöperation Necessary
The Consumer's Duty
Quacks and Quackery
Vaccination
Social Evil
Eugenics

Notes on Food.

Balancing the Diet
Common Foods Classified
Table of Food Values
Calories of Food Consumed in Different Occupations
Bibliography
Diet and Fatigue

Notes on Overweight and Underweight.

Mortality of Men over Average Weight
Mortality of Women over Average Weight
Diet for Overweight
Exercise for Overweight
Mortality of Men under Average Weight
Diet for Underweight
Exercise for Underweight

Notes on Posture.

Corrective Exercises for Faulty Posture
Corrective Exercises for Flat Foot
Consult Specialist
Detecting Weak Feet

Notes on Alcohol.

Influence of Alcohol on Longevity
Consumption of Alcohol
Laboratory and Clinical Evidence Relating to Physiological Effects of Alcohol
Effect on Brain and Nervous System
Influence on Bodily Resistance to Disease
Effect on Circulation
Food Value
Effect on Offspring
Bibliography

Notes on Tobacco.

What It Is
History
Composition
Effects on Animals and Man
Smoking and Athletics
Smoking and Scholastic Standing
Insurance Experience
Poisonous Effects—Hardened Arteries
Heart and Circulation
Surgical Operations
Acute Diseases
Insomnia
Blindness
Catarrh
Acid Dyspepsia
Summary
Bibliography

Avoiding Colds.

Infection
Local Resistance
General Resistance
Skin Training
Fresh Air

Other Means
Nasal Toilet
Emergency Treatment of Colds

Signs of Increase of Degenerative Diseases.

Increases and Decreases in Death-Rate by Age Periods
Death-Rate Registration Area Organic Diseases
Occupied Males-Increase, Decrease from Certain Diseases

Comparison of Degenerative Tendencies Among Nations.

United States
Prussia
France
Italy
Sweden
Death-Rate per 1,000 in Prussia by Age Groups
Death-Rate per 1,000 in Denmark by Age Groups
Death-Rate per 1,000 in Sweden by Age Groups
Death-Rates at 12 Groups of Ages, and Infant Mortality in England and Wales

Eugenics.

Attainable through Heredity
What Eugenics is Not
Discovery of Heredity Laws
Rules of Eugenics
Inheritable Traits
Physical
Mental
Moral
Distribution of Traits
Socially Noble and Ignoble Traits
A Majority of Sterling Traits
Successive Generations and Fraternities
Results of Specific Matings
Technicalities Explained
Dominant and Recessive Traits
Instances of Eugenic Improvement
Education, Segregation, Sterilization
Bibliography

Conceding that the immediate cause of physical decay and breakdown is largely a matter of infection, we must continually remember that the soil is prepared by heredity, and by the mode of life. Organs that are overworked, or tissues that are poisoned offer poor resistance to infection. In considering the effect of alcohol and tobacco, we must bear in mind that it is not alone the immediate toxic effects of such drugs, but their collateral effects that may impair the organism. The higher death-rate among so-called moderate users of alcohol can no longer be questioned, in the light of recently assembled insurance experience. Statistical evidence showing the influence of tobacco on the death-rate is lacking, but there is abundant laboratory evidence to support the view that it is an arterial poison. It seems wise, therefore, to take the benefit of such doubt as there may be, while we are seeking to protect the public from the encroachment of this class of diseases. The consumption of tobacco in this country is enormous. It is three times, per capita, that of Great Britain. Here again it is not alone the poisonous effects of tobacco, on heart and circulation, but its influence as a narcotic, in lessening physical activity and in forming one feature of careless self-indulgent living.

Over-nourishment is another important influence. The high mortality among overweights has been clearly shown by life insurance experience. The examinations of the Institute likewise show a high proportion of impairments of the heart, blood vessels and kidneys in those showing overweight and over-nourishment.

In all these classes I have mentioned—alcohol users, tobacco users, overweights—the proportion of cardio-vascular-renal impairments is higher

than it is in those not presenting these conditions.

The most unfavorable class that we have thus far examined is those affected with mouth infection. In one group of 1,000 industrial workers, 78 per cent. of those thus affected showed some impairment of heart, blood vessels or kidneys.

Lack of exercise among the sedentary and over-exercise among manual laborers and athletes must both be recognized as important influences.

Constipation, colonic stasis, is also a potent factor, whether its specific effect be that of sub-infection or chemical poisoning. On the one extreme we have Adami stoutly for sub-infection; on the other, Lane, insisting on so-called auto-intoxication, an unfortunate and improper term, which should be restricted to poisons formed by the body cells. Whatever view one takes, no one can question the importance of regularly clearing the intestinal canal. The favorable effect of such a measure in well-established cases of arteriosclerosis cannot be disputed. Also we must not too readily consign to the scrap heap Metchnikoff's theory as to the value of sour milk in limiting bacterial activity in the large intestines especially in view of present knowledge regarding sub-infection or the migrating tendencies of the bacterial flora.

About 16 per cent. of people we have examined admit constipation and a much larger number suffer from colonic stasis without realizing it. Of those admitting constipation, 69 per cent. showed affection of heart, blood vessels or kidneys.

Syphilis must of course be considered in relation to arterial and organic disease. Syphilis is essentially a disease of the arteries, and I think that the arterial disease due to syphilis should be considered separately, as syphilis, and not grouped with general arteriosclerosis. Some authorities have stated that 60 per cent. of arteriosclerotics are syphilitics. The evidence thus far obtained in our examinations at the Institute has not supported this contention. The death-rate among syphilitics, who have been thoroughly treated and supposedly cured and then accepted for life insurance, is nearly double that of insurance risks generally. Any widespread dissemination of syphilis throughout the population would mean a death-rate far higher than now obtains. I know of no evidence to support the view that syphilis is responsible for the *increasing* mortality from cardio-vascular-renal diseases. It has, of course, for many years been a serious menace that should be vigorously combated, but we must not accept the findings of work houses, dispensaries, hospitals and other institutions, where specially unfavorable groups are aggregated, as reflecting conditions in the great mass of the population.

Gonorrhea must not be forgotten as a frequent cause of focal infection, especially of the deep urethra and of the seminal vesicles.

The influence of the infective fevers such as typhoid, measles and scarlet fever in injuring the vital organs and tissues must also be recognized, but these forms of infection are decreasing and cannot be called in to explain the *encroachment* of degenerative disease.

We may summarize the rational measures that should be taken to combat the further encroachment of these cardio-vascular-renal diseases as follows:

First: Eugenics;

Second: Periodic physical examination;

Third: The practice of personal hygiene.

All available educational channels should be utilized to induce the public to employ these measures. I would lay special emphasis on over-nourishment, ill-balanced nourishment, excess of meat and highly stimulating foods, high tension living and mental strain, lack of exercise, excess of exercise, alcohol, tobacco, constipation and intestinal poisoning and focal infection, especially but not solely in the head, as the most important causes of chronic diseases that we have to fight.

Let us not be satisfied with the death-rate from heart disease, apoplexy and nephritis, any more than we have been satisfied with the death-rate from tuberculosis and typhoid. Let us not supinely consent to the theory that man cannot live beyond 95 because the insurance tables say so. Let us do our work unhampered by such preconceived limitations, and utilize every means that science can command to improve the human stock, not merely by lengthening life, but by adding to its meaning, its quality and its total value.

Discussion.

H. E. Mock, M. D.: Dr. Fisk and the Life Extension Institute are doing an admirable work, especially in educating the public along health lines including the better supervision of their bodies and the correction of conditions that may later on lead to disease.

We have all suspected that very few men are in perfect health, and Doctor Fisk's findings of 100 per cent. imperfect in 1,000 examinations proves our suspicions.

Industrial hygiene and prevention of disease and accident is one of the broadest specialties that has entered the field of medicine. It is such a new work that those of us engaged in it are still pioneering and are seeking for facts and results.

A number of large industries throughout the country in the last few years have installed their own health departments and are doing excellent work in industrial hygiene, prevention of accidents, examination of employees, and disease prevention. For six years I have been engaged in this work with an industry employing over 10,000 men. We have gone into the problems of examination of employees very thoroughly, and a comparison of our findings with those of Doctor Fisk will be of especial interest.

Out of 9,971 complete general examinations made last year, 2,585, or 25.9 per cent., showed definite diseased conditions, which could be classed as moderate to serious. Many had more than one diseased condition, however, which would run the total number of diseases found to a higher percentage. The percentages of these diseased conditions differ considerably from Doctor Fisk's findings. Thus, from a total of 9,971 examinations:

	Per cent.
Valvular heart disease	2.2
Myocarditis or functional heart disease	3.0
Total heart cases	5.2
Kidney disease—albumin and casts	2.5
Arteriosclerosis	3.1

making a total of combined urinary and circulatory conditions of 10.8 per cent.

These lower percentages may be accounted for to a certain extent by the fact that the average age of our examinations was 26 years; that 40

per cent. of those examined were girls; and that at least 60 per cent. were engaged in office or light work and had fairly good home surroundings.

Two weeks ago, Doctor Fisk visited me and explained his method of studying the radial pulse to ascertain hardened arteries. With my assistants, we have been following this procedure and have examined some 300 cases since then, with especial attention paid to this feature. We found that about one out of every three men and boys (or 33 per cent.) have palpable arteries; but only about 3 per cent. of the girls show this condition. Also, I have examined a number of my sick patients in the hospital, and found only a small number with palpable arteries. I have not had sufficient time to arrive at definite conclusions concerning this phenomenon, but am positive of these facts:

1. That boys and men engaged in more active work and exercise have more easily palpable arteries.

2. That girls in good health and with an artery that is easily felt show only a few cases of palpable artery when the blood stream is obliterated from the artery above and below.

3. That sick persons and those in a run-down condition show only a slight tendency to palpable arteries under the same conditions.

4. That frequently the artery is felt in the right wrist and not in the left, or vice versa.

These facts give rise to this thought: Is it not possible that active work and exercise give a certain tone to the arteries, comparable to the firm tone given to the muscles of the body under these conditions? And may this not be an indication up to a certain extent of good health, rather than a diseased condition? Furthermore, I would doubt the diagnosis of hardened arteries in the majority of these cases without a histological examination to prove such a condition.

Besides these circulatory diseases, we found many other diseased conditions, which correspond more closely with Dr. Fisk's findings:

	Per cent.
Lung findings	3.1
Tuberculosis	1.7
Acute or chronic tonsilitis	3.9
Anemia or chlorosis (by blood examination)	1.9
Diabetes	.06
Contagious diseases	.3
Venereal diseases—syphilis; gonorrhea (men only)	.6
Among 5,000 men examined, we found:	
Herniæ	3.2
Unprotected by truss	2.5
Varicocele, hydrocele, and undescended testicle	.5
Flatfoot	2.
Minor defects found in both men and girls:	
Defective vision	35.
Uncorrected defective vision	5.
Deafness	4.
Constipation	20.
Skin diseases	4.
Teeth—caries, pyorrhea, etc	93.
These examinations were made by a dentist, which accounts for the high percentage.	
Hypertrophied tonsils—not definitely diseased	48.

We have heard here the results of medical examination of employees as far as diseases found are concerned. How about the other results? Does this work actually pay the concerns doing it? Emphatically, it does; and here are some of the reasons:

1. Last year there was a 28 per cent. increase in the membership of our Mutual Benefit Association, as compared with three years ago. In spite of this increase, there was a decrease of 40 per cent. in the amount of sick disability.

2. Here are some of the ways in which it pays, the value of which cannot be estimated.

(a) The removal of the man with organic heart disease or kidney trouble or other chronic disease that has reduced his efficiency for his regular heavy work, and placing him in lighter work where he can again become efficient.

(b) The preventing of employment of badly diseased persons, who could never become efficient employees and who very likely could remain on the job only a very short time. Saved, for the management, the cost of employing them and the cost of teaching them their work—estimated by some to represent an average of $35.00 per person.

(c) The 20 per cent. decreased efficiency of the man with a rupture, and his increased efficiency after it is discovered and repaired.

3. In discovering tuberculosis alone it has paid this concern as follows:

(a) In six years we have prevented 217 active cases from being employed.

(b) Have discovered 249 cases among our employees and have taken care of them.

(c) 140 have been cured and are back at work from one month to five years.

It has been impossible to estimate the increased efficiency of the entire working force by ruling out these cases of tuberculosis and these sources of contamination.

Above all, the far-reaching, humanizing influence of this industrial hygiene work is beyond price. And, did you ever think of it—I believe such medical work as this is driving our country into the truest form of Socialism.

"Census of the Deaf and Dumb—1910."

Review by Louis I. Dublin, Metropolitan Life Insurance Company, New York, N. Y.

Under this title the Census Bureau has recently issued a preliminary bulletin giving the results of the first statistical study of deaf-mutism in this country. The tabulation covers in some detail 19,154 deaf-mutes who returned replies to the Bureau's special inquiry blank out of the total of 44,708 persons originally reported as deaf and dumb by the enumerators of the Thirteenth Census. These 19,154 cases are distributed by geographic divisions, by age and sex, race and nativity, marital condition, and age at which hearing was lost.

The most interesting table is the last, which shows the distribution according to age when hearing was lost. 11,613, or 60.6 per cent. of all the cases, were acquired rather than congenital cases of deafness and of this number 42.9 per cent. were acquired between the ages of one and three. This fact is significant, since it is at the earlier ages that children are most susceptible to measles, whooping cough and other diseases which often result in deafness.

From the figures given in the tables, one would infer that there was a preponderance of deaf-mutism among males, at all ages, among both white and colored, and among the native as well as the foreign born; the sex ratio for the deaf-mutes is 121.4 males to 100 females as compared with 106.0 in the total population. The age distribution of the deaf-mutes is also very different from that of the general population. This is especially marked at the ages under five, which comprise only 1.6 per cent. of the total number of deaf-mutes as against 11.7 per cent. in the population as a whole. The whites show a greater incidence of deaf-mutism than the colored; they form 94.1 per cent. of the defectives, although the whites comprise only 88.8 per cent. of the population. Similarly there is a preponderence of native born among the deaf-mutes; they form 89.9 per cent. of the total as against 83.7 per cent. in the population. Whether the above conclusions can properly be drawn depends entirely upon whether those who returned inquiry blanks are representative of all deaf-mutes. The question is especially pertinent in connection with the apparently greater incidence of deaf-mutism among the whites and the native born; for, in general, one would expect a proportionately larger number of returns from them than from the colored and the foreign born deaf-mutes.

The second and fuller report is awaited with interest. It will cover such points as deafness among relatives, facts about schooling, means of communication, occupation and earnings.

Louis I. Dublin.

COÖPERATION IN PUBLIC HEALTH ADMINISTRATION AT LASALLE, PERU AND OGLESBY, ILLINOIS.

GUSTAV F. RUEDIGER, M.D.,
Health Commissioner for LaSalle, Peru and Oglesby, LaSalle, Illinois.

Read before the American Public Health Association, Health Officers' Section, Jacksonville, Fla., Dec. 3, 1914.

COÖPERATION in public health administration is still in the experimental stage and to my knowledge only two experiments have been undertaken in this promising field. The first of these was carried out in Massachusetts about two years ago, under the leadership of Prof. Earl B. Phelps, and the second is the one about to be described from Illinois.* In the Massachusetts experiment eight communities agreed to cooperate, but four of them came in for milk and dairy inspection only. In our experiment we are serving only three cities but our central health department has entirely replaced the old boards of health in these cities. Another vital difference between this experiment and the one in Massachusetts arises out of the fact that ours is supported entirely by a private donation. The scope of the work also is somewhat different in that we aim to give ample time to the chief health officer and the bacteriologist for original research.

LaSalle, Peru and Oglesby are three small industrial communities located in north central Illinois. They have a joint population of approximately 28,000 people, most of whom are supported by common labor in three cement works, two zinc works, a clock factory, a plow factory and a number of coal mines. LaSalle and Peru are situated closely together and are separated only by a political line, whereas Oglesby is nearly five miles south of LaSalle. Transportation between LaSalle and Peru is greatly facilitated by a street car line giving a fifteen minute service, but Oglesby must be reached by automobile, and a small runabout is part of the equipment of the health department.

We have a very cosmopolitan population as the labor in these industries is furnished chiefly by Poles, Austrians, Lithuanians, Irish and Germans. Many of them are almost illiterate, or entirely so, in so far as our language is concerned. They know very little about sanitation, civic pride and civic cleanliness, and it is difficult to interest them in these matters. The housewives have no thought of doing wrong when they throw their dish water, wash water and other kitchen and table refuse out of the window or back door, and leave it there for nature, flies and rats to dispose of. They have always done this and feel that their personal liberties are being interfered with when they are asked to get a garbage can or to construct a closed drain to carry waste water to the nearest city sewer. Manure piles and insanitary open privies are to be found in every section of the community.

* Public Health Reports, 1914, 29, p. 2477.

There was hardly a single block in these three municipalities last spring that did not have its quota of them. Indeed some of the residents are strongly prejudiced against the use of a modern indoor toilet, believing that the odors produced generate disease.

LaSalle has for many years had a fairly good milk ordinance but the only thing that was done under it was to collect the ten dollars license fee for each wagon and to make a butter-fat test once a month. Peru and Oglesby have had no milk ordinance and none of the three health departments paid any attention to dairy inspection or to the bacteriological content of the milk sold. All milk sold in Peru and most of that sold in LaSalle was delivered in cans in an uncovered wagon, from which it was dipped with a dipper and transferred to the receptacle brought out into the street by the housewife.

Quarantine regulations were lax and difficult to enforce, and in a recent epidemic of smallpox many patients were kept concealed while others openly walked the streets in defiance of the regulations of the health department. Moreover, there was no isolation hospital to confine these patients and it often was very perplexing to the health officer to know what to do with them. Under these circumstances, which were most favorable for the spread of contagious diseases, smallpox, diphtheria and scarlet fever were very prevalent for many years, and often were epidemic.

This unsatisfactory state of affairs was clearly seen by many of our citizens but it was difficult to find a way out. It was evident that these three municipalities could not each support a modern health department with its various specialists. The old health departments did not seem to have the confidence of the people, had very little financial support, and nobody on their staffs with special training in public health work and therefore hesitated to undertake the necessary reforms. Finally Mr. F. W. Matthiessen, with the advice of his son-in-law, Dr. Philip S. Chancellor, made a proposition to establish a modern health department for LaSalle, Peru and Oglesby, with headquarters at LaSalle, and supported by a private donation from Mr. Matthiessen. After a conference with the present director the following plan of operation and organization was drawn up and submitted to each of the three city councils, in October, 1914, for acceptance: The plan provided for the establishment of a hygienic institute in LaSalle, under the general guidance of a director who was to be chosen by Mr. Matthiessen and Doctor Chancellor. At the institute were to be provided properly furnished offices with filing cases, desks, record cards and reference books, and a completely equipped laboratory for making bacteriologic diagnoses of infectious diseases and sanitary chemical and bacteriologic analyses of water and foods. The director of the hygienic institute was to be accepted by each of the three cities as their chief health officer or health commissioner; but in order to give this organization a legal standing it was necessary that the mayor and city council in each of the three cities should appoint an assistant health officer who is a resident of the

city in which he serves. This was essential because our state law requires that the city health officer shall be a resident of the city in which he serves.

In order to keep these appointments out of politics as much as possible the director of the institute is given the right of nomination of these appointees. It is understood that these assistant health officers shall work under the direction of the director of the institute, but we have no written agreement to the effect. This coöperation is secured, however, by virtue of the fact that they draw their salaries from the hygienic institute, the funds of which are controlled by its director. The director has a three years' contract with Mr. Matthiessen which gives him rather full control of the institute, and the city ordinance gives him full charge of the health department. He is empowered to select his staff of assistants which at present consists of a bacteriologist, a school nurse, an infant welfare nurse, a dairy inspector, a stenographer and book-keeper, a laboratory helper and the three assistant health officers just referred to. Everybody on this staff draws his salary from the fund given by Mr. Matthiessen.

Our plan provided further that each of the three municipalities shall engage a sanitary policeman, who is to work under the direction of the health commissioner, but shall be paid by the city. The cities were also to provide for the collection and disposal of garbage, and to adopt a more up-to-date sanitary code which would embody recommendations made by the director of the hygienic institute.

The three assistant health officers are medical practitioners and give only a part of their time to this work. They act in the capacity of medical inspectors and are virtually in charge of the contagious diseases in their respective districts. All contagious diseases are, however, reported to the central office and epidemiological investigations are conducted from that office.

The general plan outlined was accepted in October, 1913; the new ordinances were passed in April, 1914, and the new health department took charge on May 15, 1914.

In formulating our plan of organization of the hygienic institute and the coöperative health department, economy of operation was not the paramount consideration. The first thing sought after was efficiency in public health administration, but those who advanced the project were desirous that original research should also be provided for. We therefore aimed to have assistants enough to allow the director and the bacteriologist to devote considerable time to this important side of the work. Mr. Matthiessen's donation in support of this work was as follows: Twelve thousand dollars for a suitable building for offices and laboratory, five thousand dollars for laboratory equipment and office fixtures, and sixteen thousand three hundred and fifty dollars, annually, for salaries and maintenance.

When we started the work last spring we centered our efforts on the insanitary condition of the alleys and on the milk supply. We found that most people threw all kitchen refuse and other waste into the alleys. Some

used old wooden boxes or barrels and a few (not over 25 families) had covered, water-tight garbage cans. Stable manure was thrown anywhere in the alleys or on vacant corners of lots. These conditions were considerably improved, but not without a number of legal battles. There still are a great many uncovered garbage cans in the city, and many owners of horses have not yet provided a covered box for holding the manure. All grocery stores, meat markets and restaurants are being systematically inspected and scored and the schoolhouses are visited daily by either a school nurse, or one of the assistant health commissioners. All dairies have been inspected and scored and the dairy cows will soon be tested for tuberculosis. The milk delivered in the cities is subjected to bacteriological and chemical analysis several times a month. In LaSalle all milk is now delivered in sterilized bottles but in Peru the greater part of it is still dipped from cans in open wagons, in the streets. Permanent records are being kept of all contagious diseases, births and deaths for the first time in the history of these municipalities. The open privies are slowly being wiped out but most of these improvements are meeting with intense opposition. We hope, however, that the greater part of this opposition will cease in time as it will soon become apparent that these improvements are for the good of everybody. Industrial hygiene is part of our program but thus far it has been impossible to give any time to this part of the work.

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RATIONALITY IN THE CONTROL OF MEASLES.

In its broadest aspect the progress of sanitation is a constant warfare, not only against the causes of disease, but also against the intrenchments which they have occupied in our own territory of tradition. The discovery and use of new and better weapons has resulted, it is true, in the regaining and refortifying of much of that territory, especially in the conspicuous major regions of attack. But, at the same time, better information and strategy point out the necessity for activity in certain fields formerly little considered. Take, for example, measles, classed conventionally as a "minor contagious disease." Regarded with indifference or contempt, its visitation has traditionally been accepted by parents as an incident of childhood almost as common and unavoidable as teething. Doctors, too, have shared this attitude. Health officials, seeing attempts at control by ordinary methods swamped in periodical epidemics, have either abandoned the matter to simple *laissez-faire* or dismissed it with arbitrary routine regulations—perhaps with some educational publicity.

But the warning voice of the statistician has been heard, indicting measles (with its congener whooping cough) as an arrant mischief-maker and mortality-producer. The United States Census mortality statistics, for example, show that measles, the "minor" communicable disease, ranks in mortality with scarlet fever of the "major" group. In communities where diphtheria is under the best control it may even vie with that disease. The figures for the Registration Area indicate that on the average there are, in the whole United States, not far from 10,000 deaths a year ascribed to measles, not to speak of untabulated effects of a morbidity of unnumbered cases.

Despite the frequent occurrence of epidemics of measles it is significant of pessimism that few attempts have been made to secure from them data on which

to base measures of control. Now, however, there comes to hand a thorough study of an epidemic of 254 cases at Palo Alto, California, by the health officer of that city, Mr. H. F. Gray, which again raises, and, furthermore, greatly assists in clarifying the whole matter. The data secured, together with reference to existing experimental data and regulations, are set forth in a paper, appearing in the recent November number of the *Journal of Infectious Diseases*, which merits the close consideration of every health officer. The affirmation, in this paper, of the value of isolation; the fresh data on periods of incubation and infectivity; the advocacy of a just, scientifically determined duration of quarantine; and the description of a method of attack, through the definite coöperation of parents and school-teachers, on the difficult problem of early recognition of the disease: are all points of prime importance. To attempt to summarize further here would be to distract attention from the significant details of the study itself. Its sum total in effect is the conclusion that definite rational measures are possible in the control, even though partial, of a disease which has too commonly and too long been regarded as an insoluble if not a negligible public health problem.

PELLAGRA.

From earliest times in the history of pellagra, diet has been held to play an important rôle in the disease. The dietary theories have been numerous and varied and have for the most part concerned themselves with corn. The best known of these is the spoiled maize theory of Lombroso which forms the basis of the Italian government's efforts to eradicate the disease. In this country, this as well as other food theories have found but small favor. Indeed, until within about a year, the trend of American opinion was strongly in favor of the view that pellagra is an infectious disease. The investigations of the Public Health Service during the past year would seem to make this view almost if not quite wholly untenable; they present a dietary conception of the disease that seems strikingly analogous to that of beriberi.

In accordance with his epidemiologic findings in 1914,* Goldberger suggested that it might be well to attempt to prevent the disease by providing those subject to pellagra with a diet such as that enjoyed by well-to-do people, who as a class, are practically free from the disease, in other words to modify the diet, of the group or class affected, by reducing the proportion of the cereals, vegetables and canned foods and increasing that of the fresh animal foods, such as fresh meats, eggs and milk, in their diet.

A test of the preventive value of diet based on this proposal has been carried on for a year at two orphanages in Mississippi and at the Georgia State Sanitarium. Goldberger, Waring and Willets summarize their report† of this work as follows:

1. The diet at two orphanages, "M. J." and "B. J.," for several years endemic foci of pellagra, was modified in accordance with the directions of the writers in September, 1914. Hygienic and sanitary conditions have remained unchanged.

2. The modification in the diet consisted principally of a marked increase in the fresh animal and the leguminous protein foods.

3. Since the change in diet at orphanage "M. J.," there has not been observed any recognizable evidence of a recurrence in any of the pellagrins of 1914, 67 of whom remained under observation until they had completed at least the anni-

* U. S. Public Health Reports, Oct. 23, 1914.

† U. S. Public Health Reports, Oct. 22, 1915.

versary date of their attacks; nor have any new cases been observed among the non-pellagrin residents of 1914, 99 of whom have been under observation for not less than a year.

4. Since the change in diet at orphanage "B. J.," there has been observed this year but a single individual with recognizable evidence of a recurrence among the pellagrins of 1914, 105 of whom remained under observation until they had completed at least the anniversary date of their attacks; nor has any new case been observed among the non-pellagrin residents, 69 of whom have been under observation not less than a year.

5. At the Georgia State Sanitarium, an endemic focus of pellagra, a ward of pellagrins in the colored female service and one in the white female service was organized in October and December, 1914, respectively, for a test of diet in the prevention of pellagra.

6. The diet in these wards was modified on the same principle as that at the orphanages. The institution routine and the hygienic and sanitary conditions have remained unchanged.

7. Since the change in diet and up to October 1, 1915, there has not been observed this year any recognizable evidence of a recurrence in any of the pellagrins in these wards, 72 of whom (36 colored and 36 white females) have remained continuously under observation throughout this period or at least until the completion of the anniversary date of their 1914 attacks.

8. During the corresponding period of observation not less than 15 (47 per cent.) of 32 control female pellagrins have presented recurrences.

The conclusion drawn by these workers is that pellagra may be prevented by an appropriate diet without any alteration in the environment, hygienic or sanitary. This marks a notable sanitary advance; an advance as great or greater than that made by Takaki in his work on beriberi in the Japanese navy.

Significant as this work is with regard to the nature of the disease, additional and practically conclusive light is thrown on this phase of the subject by the results of an experiment recently reported by Goldberger and Wheeler. These workers placed eleven convict volunteers on a restricted, one-sided diet consisting of cereals (wheat, corn, rice), sugar, cane syrup, sweet potatoes, pork fat and greens. After five to six months of this diet, at least six of the eleven volunteers, all healthy white males, developed pellagra.*

At the isolated convict camp in Mississippi where this experiment was carried out, no pellagra had previously occurred nor did any of the other (control) convicts, averaging 70 to 80 in number, nor any of the free persons resident at this camp show any suspicion of the disease. The conclusion to which Goldberger and Wheeler are led is that pellagra has been caused in at least 6 of 11 volunteers as the result of the restricted diet on which they subsisted.

These distinctly epoch-making studies give the sanitarian a scientific basis for a rational attack on what within a few years has become one of the most important causes of morbidity and mortality in many of the states. In view of the manifest advantage of a wholesome diet as shown by these experiments, it would seem that any physician having to treat cases of pellagra in his practice should be able practically and at once to put these conclusions to the test.

J. W. K.

* U. S. Public Health Reports, Nov. 12, 1915.

George Miller Sternberg, M. D., LL. D.

An Appreciation.

SURGEON-GENERAL STERNBERG, retired, died at an early hour on November 3, 1915, at his residence in Washington, D. C. He was born June 8, 1838, at Hartwick Seminary, Otsego County, New York. His father, the Reverend Levi Sternberg, a Lutheran clergyman, and for many years principal of Hartwick Seminary, was a descendent of Nicholas Sternberg, one of the early German settlers (1703) from the Palatinate. His mother, Margaret Levering (Miller) Sternberg, was the eldest daughter of Reverend George B. Miller, D. D., for many years professor of Theology in Hartwick Seminary.

George M. Sternberg was the oldest of a family of ten children and received his early education at Hartwick Seminary. At the age of sixteen he commenced teaching school at New Germantown, N. J., and became self-supporting. Having decided to study medicine, at the age of nineteen he entered the office of Dr. Horace Lathrop of Cooperstown, N. Y., and subsequently attended the College of Physicians and Surgeons, New York, from which institution he graduated in the class of 1860, and commenced the practice of medicine in Elizabeth City, N. J.

At the outbreak of the Civil War, Doctor Sternberg passed the examination for the Medical Corps in a class of twenty-one, and was appointed Assistant Surgeon, U. S. Army, May 28, 1861. He was present at the first battle of Bull Run and received official commendation from Brigadier-General George Sykes for his services in the earlier battles of Gaines's Mill, Turkey Bridge, Malvern Hill, and also brevet commissions for faithful and meritorious services during the war. He also received the brevet commission of Lieutenant-Colonel "for gallant service in performance of his professional duty under fire in action against Indians at Clearwater, Idaho, July 12, 1877."

It is a fact worthy of note that Doctor Sternberg has seen more active service on the battlefield and in Indian campaigns, than any other medical officer with whose records we are familiar. Nor do the official records disclose the name of a single medical officer, who has faced as often and courageously the danger of cholera and yellow fever epidemics. During the cholera epidemic at Fort Harker, Kansas, in 1867, he lost a beloved wife, and, by a strange coincidence, he was also the post surgeon when yellow fever gained a foothold among the troops at Fort Columbus, New York Harbor, in 1871.

Having witnessed the devastating effects of these hydra-headed diseases and realizing that medical science had not yet discovered the real cause of these scourges, it was perfectly natural that a man of Doctor Sternberg's sympathetic nature and truly scientific spirit should have determined to devote his life to the study of these mysteries.

As a result of his experience at Governors Island, he was ordered to the yellow fever zone in 1872, and served at New Orleans and Fort Barancas, Florida where his wife courageously accompanied him. At the latter post he passed through two epidemics of yellow fever in 1873 and 1875. During the latter epidemic he suffered, himself, a severe attack. His first publication of scientific value related to the clinical history of yellow fever as observed by him during these outbreaks. In 1876 he was ordered to the Pacific Coast and in the following year he was engaged and distinguished himself in an active campaign against the Nez Percés Indians. It was the good fortune of the writer of this biography to meet Doctor Sternberg for the first time in the fall of 1877 at Fort Walla Walla, and the impressions then created as to the studious habits and critical character of Doctor Sternberg's mind have never been effaced. In addition to his duties as post surgeon he was then mastering the French language and was deeply interested in the germ theory of disease.

In 1878, while stationed at the same post, he began his experiments to determine the practical value of disinfectants, using putrefactive bacteria as the test of germicidal activity. These experiments were subsequently continued in Washington, D. C., and in the laboratories of the Johns Hopkins University, under the auspices of the American Public Health Association, as chairman of a committee appointed

and given an appropriation for the purpose of making such investigations. The results of the investigations were published in full in the Transactions of the American Public Health Association in 1888, but had won for him the "Lomb prize" as early as 1886. This prize essay, published in 1886, and revised by Doctor Sternberg in 1899, has been translated into several foreign languages, and practical measures of disinfection in this country and abroad are largely based upon the results obtained in these investigations. It may be truly said that scientific disinfection had its inception with the labors of Koch and Sternberg.

No one unless familiar with bacteriological work can have the slightest conception of the magnitude and painstaking labors involved in the determination of the "thermal death point of pathogenic organisms and the germicidal value of certain chemical and physical agents." It meant daily and exacting application extending over a period of years, but it was glorious work in the battle against infectious diseases. The eradication of preventable diseases is the highest aim of scientific medicine today, and in this field Doctor Sternberg was one of the foundation builders.

Doctor Sternberg's labors were not limited to this special field, for in the interval we find him active in other research work. In 1880 he discovered the micrococcus now recognized as the specific cause of croupous pneumonia and demonstrated the fact that it is found as a saprophyte in the buccal secretions of the mouths of perfectly healthy individuals. Later (1885) he demonstrated the fact that the micrococcus of sputum septicemia—his micrococcus Pasteuri—is identical with the capsulated micrococcus found in the rusty sputum of patients with croupous pneumonia. While it has fallen to the lot of Fränkel to share the credit of this important discovery, there can be no question that Doctor Sternberg first recognized and described the organism, although he did not associate it in his first publication with pneumonia, as he found it in his own and the buccal secretions of other healthy subjects. His work on sputum septicemia also for the first time explained the virulent character assumed in many instances by the bites of human beings.

In 1881, while stationed at Fort Mason, California, he demonstrated and photographed probably for the first time in America the tubercle bacillus, which had been discovered by Koch in 1881.

In the same year he demonstrated that the so-called "bacillus malariæ" of Klebs and Tomasi Crudelli was not an etiological factor in the production of malaria, which served to concentrate attention upon Laveran's plasmodium discovered in 1880, and it was finally proved by the work of Manson and Ross that the mosquito was the intermediate host of the malarial parasite. It was also Doctor Sternberg's good fortune, in 1885, upon his return from the International Sanitary Conference in Rome, to demonstrate for the first time in this country the plasmodium of Laveran in freshly drawn blood from a malarial patient. This demonstration was made in the pathological laboratory of the Johns Hopkins University and the amæboid movements of the plasmodium in the interior of the red blood corpuscles were plainly visible.

In 1886 he introduced the bacillus of typhoid fever to the medical profession in this country, in a paper read before the Association of American Physicians.

Doctor Sternberg's investigation with reference to the etiology of yellow fever date back to 1871, although his search for the specific organism commenced in Havana, in 1879, while a member of the Havana Yellow Fever Commission, and was continued for about ten years. During this time he twice returned to Havana during the months of yellow fever prevalence, and visited Rio de Janiero and Vera Cruz, also the town of Decatur, Alabama, during the epidemic of 1888. His report, published at the conclusion of these extended investigations, shows that all researches made to that date had failed to demonstrate the specific cause of yellow fever. He showed that the generally accepted claims of Domingos Freire, of Brazil, to have discovered the germ of this disease—his "cryptococcus xanthogenicus"—and a method of producing immunity by inoculations had no scientific foundation. He also showed that the bacillus of Gibier, the "micrococcus tetragenus" of Finlay, and various microörganisms encountered by himself and by other investigators bore no etiological relation to the disease. At the International Medical Congress, held at Berlin in August, 1890, the writer translated

Doctor Sternberg's letter to Professor Hirsch, giving a synopsis of his work and stating that so far the specific organism of yellow fever had not been discovered. It certainly speaks well for his painstaking work that even now, when we know that the infectious agent is transmitted through the sting of a mosquito, and the search has narrowed down to the body of this insect, it has not been isolated and neither he nor others have found it, probably because it is ultramicroscopic.

Having exhausted the resources at his command in his search for the germ of yellow fever by microscopical examination of the blood and tissues, by culture methods and by experiments on the lower animals, he felt that the only method left which offered any promise of success was that of direct experiment on man. If the blood of a yellow fever patient contained the specific infectious agent, this should be shown by inoculating a non-immune individual with such blood.

This line of research was pointed out by Surgeon-General Sternberg to Major Walter Reed, chairman of the Yellow Fever Commission in 1900, as was also the probability that it would ultimately be found that the disease is transmitted from man to man by an intermediate host.

In justice to all concerned, it should be remembered that when this commission was organized by General Sternberg, the claim of the distinguished bacteriologist Sanarelli to have demonstrated the etiological relation of his "bacillus icteroides" was generally accepted, and had been recently confirmed by two medical officers of the Public Health and Marine Hospital Service sent to Cuba for the special purpose of investigating this claim. To General Sternberg it appeared impossible that a bacillus, which is easily demonstrated under the microscope and which grows in ordinary culture media, could have escaped his observation during his extended researches, if it were in fact the specific cause of yellow fever. The only possibility such causal connection seemed to him to depend upon the identification of Sanarelli's bacillus as identical with a certain bacillus found by Sternberg in a limited number of cases during his researches in Havana. A comparison of cultures of the two microörganisms made by Major Reed at the Army Medical Museum, 1899–1900, showed that they were not identical and General Sternberg, being satisfied that Sanarelli's bacillus was not concerned in the etiology of yellow fever, organized in 1900 the Yellow Fever Commission, with Major Reed as chairman. Major Reed's investigation resulted in the demonstration that in yellow fever the specific infectious agent is present in the blood of those suffering from the disease and that the usual and probably only method of transmission of the disease is through the bites of mosquitoes of the genus Stegomyia. This brilliant demonstration by Reed and his colleagues has furnished the necessary basis for preventive measures, which have been applied with entire success in the yellow fever zone, and the practical results are of incalculable value to mankind.

The writer does not consider it unfair to the memory of Major Reed and his colleagues when he declares that much of the success achieved was rendered possible by the preliminary work of Doctor Sternberg, who had eliminated numerous errors committed by others and had contested and overthrown the claims of several bacteriologists for the discovery of the specific organism. His conviction that all former claims were unfounded, or remained to be proven, is clearly evinced by the appointment of a commission which he personally selected.

It may be truly said that no history of this important discovery is complete, without a just presentation of Sternberg's preliminary work. In giving due credit to all the participants of this splendid piece of research, it must be remembered that all of this work was of the highest scientific value, and his daily contact with the sick, his autopsies and bacteriological investigations in different countries and climes, in search of the yellow fever organism, involved at least the same risks and heroism displayed by members of the Yellow Fever Commission.

Doctor Sternberg was the pioneer in this country, not only in bacteriological investigations, but in the publication of bacteriological text-books. In 1880 he translated the work of Dr. Antoine Magnin from the French. In 1884 this work was greatly enlarged and brought up to date (480 pp., 8 vo., including 152 pp. from Magnin's work).

In 1892 Sternberg's Manual of Bacteriology was published (898 pp., royal 8 vo., illustrated by numerous photographs and cuts). In 1896

this work was revised and published under the title of a Text-Book of Bacteriology.

Doctor Sternberg since 1880 has been in the habit of illustrating his published works and scientific papers by photomicrographs made by himself. He has shown himself a master in this difficult art, and in 1884 published a volume on photomicrographs and how to make them (204 pp., 8 vo.). Other published works of Sternberg are Malaria and Malarial Diseases (329 pp., 8vo., Wm. Wood & Co., N. Y.), Immunity, Protective Inoculation in Infectious Diseases and Serum Therapy (325 pp., Wm. Wood & Co., N. Y., 1895), Infection and Immunity, with Special Reference to the Prevention of Infectious Diseases (203 pp., Putnam's Sons, 1903), making in all 2,592 pages, not to mention his chapters in text-books and medical encyclopedias and over sixty other contributions to medical and scientific literature, many of which have been translated into foreign languages.

Doctor Sternberg was appointed Surgeon-General U. S. Army, May 28, 1893, and was retired for age June 8, 1902. As Surgeon-General of the Army he established the Army Medical School and encouraged medical officers to engage in scientific researches by establishing laboratories and furnishing necessary apparatus at all the larger post hospitals. He also provided all new hospitals with well-equipped operating rooms, and directed medical officers to operate for hernia, varicocele, etc., instead of discharging soldiers having disabilities curable by surgical procedures, to become life pensioners upon the government. He established the Army Tuberculosis Hospital at Fort Bayard, New Mexico. On April 25, 1898, four days after the declaration of the Spanish American War, he issued a circular calling attention to the danger from typhoid fever in the camps, the rôle of flies in the propagation of this disease, and the importance of camp sanitation. Had this note of warning been heeded, the disgraceful typhoid rates incident to unsanitary conditions of our military camps would not have been observed. He organized the "Typhoid Fever Board," with Major Walter Reed as chairman and Dr. Edward O. Shakespeare of Philadelphia, and Dr. Victor C. Vaughan, of Michigan, as members. Upon his recommendation the last-named gentlemen were commissioned as surgeons of volunteers in order that they might serve upon this board. He organized the Yellow Fever Commission of 1900 with Major Walter Reed as chairman and Doctors Carroll, Lazear and Agramonte as members.

During the Spanish American War he established general hospitals at Key West, Fla., Savannah, Ga., Fort Thomas, Ky., Fort McPherson, Ga., Fort Munroe, Va., Fort Myer, Va., Washington Barracks, D. C., and San Francisco, Cal. Two hospital ships—the *Relief* and the *Missouri*—were purchased and equipped upon his recommendation; a fully equipped hospital train was kept in service as long as required. All surgeons of volunteers and contract surgeons, with a few exceptions, were appointed upon his recommendation. He organized the female nurse corps and the corps of dental surgeons in compliance with acts of Congress which had been passed in accordance with his recommendations. He recommended a large increase in the Medical Department to correspond with the increase in the army made in 1901.

General Sternberg's brilliant services to the nation have never been adequately rewarded, but Doctor Sternberg's unceasing study, honesty and truth have gained for him recognition in the educational and scientific world.

Membership and honors in medical and scientific societies—member and ex-president of the American Public Health Association; member and ex-president of the American Medical Association; member and ex-president of the Association of Military Surgeons U. S.; member and ex-president of the Philosophical Society of Washington; member and ex-president of the Biological Society of Washington; member and ex-president of the Cosmos Club of Washington; member and president of "The President's Homes Commission" (1907); honorary member of the American Association of Physicians and three local medical societies; honorary member of the Association of American Medical Colleges; fellow of the New York Academy of Medicine; president of section of military medicine and surgery of the Pan American Medical Congress; late fellow, by courtesy, in Johns Hopkins University (1885–90); honorary member of the Epidemiological Society of London; honorary member of the Academy of Medicine of Rio de Janeiro; honorary member of the American Academy of Medicine; honorary member of the French Society of Hygiene. The LL. D. degree

was conferred upon General Sternberg in 1894 by the University of Michigan, and in 1897 by Brown University.

This sketch will not be complete without a brief reference to General Sternberg's service as a citizen of the national capital. His activities were varied and his work unceasing as shown by the following list.

President and a founder of the Washington Sanitary Improvement Company; president and a founder of the Washington Sanitary Housing Company; president of the President's Homes Commission; president of the Citizens Relief Association; president of the Washington Sanatorium Company and director of Starmont Sanatorium; chairman of Committeee on the Prevention of Tuberculosis and president of the Association when organized as such; member of Committee on International Tuberculosis Congress; president Board of Directors of Garfield Hospital; president Board of Visitors of St. Elizabeth Hospital; professor of Preventive Medicine in the Faculty of Graduate Studies of George Washington University.

Among the most beneficient of his activities may be mentioned the two housing companies of which he was one of the founders and the president from date of organization until the time of his death. The object of these companies is the erection of sanitary homes at reasonable rentals. It must have been a pleasing reflection in the evening of his life to realize that he played the leading part in providing clean, decent and healthful homes to over 808 families of moderate means. These deeds and the foundation of Starmont Sanatorium, together with the fruits secured by his leadership in the tuberculosis movement, will always remain monuments to his useful and self-sacrificing career.

In this glorious service to humanity, which claims the heart, mind and hand alike and where, alas, ingratitude is often the only recompense, Doctor Sternberg had but two beacon lights to guide him, his conscience and the example of the Great Physician. Hence what a gratification to receive upon the evening of life evidence of approval of work well done. On June 8, 1908, a distinguished body representing the army and navy, the learned professions, statesmen, social workers and citizens of the city of Washington tendered Doctor Sternberg a complimentary dinner in honor of his seventieth birthday. On November 5, 1915 his remains were buried with military honors and a large concourse of representative people of the national capital paid their last tribute to a brave medical officer, a productive scientist, philanthropist and a model citizen. Surely the world is better for having known him.

George M. Kober.

THE REGISTRATION OF COMMUNICABLE DISEASES WITH SPECIAL REFERENCE TO THE OUT OF TOWN CASE.

F. M. Meader, M. D.,
Director, Division of Communicable Diseases, New York State Department of Health.

Read before the American Public Health Association, Jackson ville, Fla., December 1, 1914.

THE reason for requiring physicians to report cases of communicable diseases to the health authorities is first of all to locate the presence of an infectious agent. When the enemy is located, measures for suppression may be adopted. If the location is not known, an extensive, expensive and often fruitless campaign may be carried on. It is therefore of great importance that all cases should be reported promptly to the health authorities.

Next in importance to knowing where an infectious agent is located is to know whence it came. The source of an epidemic may be thus determined. And, quite as important as caring for the patient, is the breaking of the chain of infection which otherwise might assume large proportions.

When the immediate treatment of a situation is accomplished there is another use of the information which is very valuable, and which, if accurate, may be of considerable service not only to the local officials, but to sanitarians in general. We refer to the number of cases appearing in a community as an index of the healthfulness of the locality, or as a means by which the local health authorities may show justification for funds expended. The case incidence may show the results of a particular activity.

From a statistical point of view the method of charging a municipality with the diseases reported in it by a group of conscientious physicians is not fair to the municipality. The faults in the system may be enumerated as follows: First, cases which were infected elsewhere are charged against a municipality because the patient happened to become ill in it. The disease having been contracted elsewhere, the local health authorities were in no way responsible for it. If they had been particularly active in eradicating this particular disease, its presence would tend to vitiate the good record that they had made, so that—Second, the case rate for a municipality may be misleading in regard to the efficiency of the health administration. Third, the sources of infection may be concealed.

Let us consider the following examples:

A. A man ill with typhoid fever at his home in the country is carried early in the course of the disease to a hospital in the city. Should the case be reported to the State Department by the city health officer or the local town health officer?

B. A women goes from her home to a community in the woods for her health. The diagnosis of tuberculosis is made at the latter place. Should the case be reported from the village in the woods, or should her home city be charged with the case?

C. A woman with tuberculosis has been reported to the State Department by the health officer of her town. Subsequently she goes to the woods. The health officer of the community in the woods reports the case, according to law. The case is thereby reported twice. Which record should stand?

D. A traveling salesman or actor becomes ill with scarlet fever in a town. He has just visited a series of places. What place should be charged with the case?

E. A country child visiting in a neighboring city unwittingly becomes exposed to whooping-cough. After it returns home symptoms of the disease become manifest. Shall the case be charged to the city or country municipality?

F. An almshouse is located in the country. The city poor are sent to live at the almshouse. The diagnosis of syphilis is subsequently made on an inmate. Shall the record of syphilis he carried by the town or city?

In deciding where a case should be properly charged, it is of the utmost importance that the source of the infection receive attention. The following two rules are therefore offered: *First, a case shall be charged against that town whence the infection was obtained. If the instance of exposure is not known, the visit must be consistent with the incubation period of the disease. The health officer of the municipality must be notified and agree that the exposure was possible. Second, when the municipality in which the infection occurred is not known, it must be charged to the municipality from which it is reported.*

If these two rules are applied to the above mentioned cases the result will be as follows:

A. The man ill with typhoid fever at his home in the country and carried early in the course of the disease to a hospital in the city will be charged to the home town. Rule 1.

B. The woman who went for her health to live in a community in the woods, and who subsequently was reported as having tuberculosis will be reported from "the woods" but the case will be charged against her home town. Rule 1.

C. The woman affected with tuberculosis which was reported and who subsequently moved to another place and was reported again will have her case charged against her first home town. Rule 1. (The second town officials are not responsible for the infection, but are responsible for permitting it to spread.)

D. The salesman who succumbed to scarlet fever after having visited a number of places, none of which he was able to identify as the source of infection, will have his case charged against the town in which he became ill. Rule 2.

E. The child exposed to whooping-cough in the city but coming down with the disease at her home in the country will be a case which should be charged to the city. Rule 1.

F. The patient at the almshouse located in the country, who had contracted syphilis in the city and came to the institution from the city, is a case which should be charged against the city. Rule 1.

The mechanism by which cases can be charged against the proper municipality consists of two parts: First, the use of a transfer report card, and second, the occasional decision of a member of the Division of Communicable Diseases in the State Department of Health. The transfer report card is prepared as follows: A card 6 inches long and 7 inches wide is perforated along the middle line, thus dividing it into two parts, each of which is 6 x $3\frac{1}{2}$ inches. The upper card has a form printed on it as follows:

TRANSFER CASE REPORT CARD.

PART I.

Date ————

THE COMMISSIONER, STATE DEPARTMENT OF HEALTH, ALBANY, N. Y.

Dear Sir: A case ———— ———— name of patient ———— age — local address — ———— has been reported to this office. It is believed that the case was infected at ———— ————about, date ———— The transfer report card has been forwarded to the health officer of Kinderhook.

Very truly yours,

———— M. D.,

Health Officer of ———— *Dist. No.* ————

Address ————

detach here

.....

TRANSFER CASE REPORT CARD.

PART II.

Date ————

HEALTH OFFICER OF ———— COUNTY, N. Y.

Dear Sir: A case of ———— name of patient ———— age — address ———— ——occupation ———— date of onset —— — was reported to this Department on ——— date. It is believed that the infection was obtained in your municipality. The case is reported to the State Department of Health and is charged against your municipality. Very truly yours,

———— M. D.,

Health Officer of ———— *Dist. No.* ————

Address ————

(A health officer receiving this card, if he is satisfied that the matter herein contained is probably true, must record the case in his record. It need not be reported to the State Department of Health. But if he disagrees, he shall fill out the blank on the back of this card and mail at once to the State Department of Health. If his reasons are just, the card will be returned to the original sender.)

PROTEST BLANK.

THE COMMISSIONER, STATE DEPARTMENT OF HEALTH, ALBANY, N. Y.

Dear Sir: I protest the referring of the above mentioned case to this municipality for the following reasons:————————————

————————————————————

————————————————————

————————M. D.,

Health Officer of————*Dist. No.*——

Address————————

(If the health officer fills out this protest blank, he need not record it on his books unless it is returned to him by the State Department of Health, stating that the reason is insufficient. If the reason is deemed insufficient by the State Department of Health, the card will be returned to the health officer making out the card originally, stating that case cannot be charged to above mentioned municipality. It will then be charged to the municipality in which the case was discovered.)

Rule 1. A case shall be charged against that municipality whence the infection was obtained; if the incident of exposure is not known, the visit must be consistent with the incubation period of the disease; and the health officer of the municipality must agree that the exposure was possible.

Rule 2. When the municipality in which the infection occurred is not known, the case must be charged to the municipality from which it is reported.

The State Department of Health, through its Division of Communicable Diseases and, if necessary, the sanitary supervisor, decides upon the merits of protested cases only. The justifiable transfer cases take their rightful place against the municipality from which the source of infection occurred.

The advantages of the system are the following:

1st. Foci of infection will be more evident by the case incident rate.

2d. Health officers of municipalities where great effort and money has been expended to secure good sanitary conditions will be able to present a more comparable figure.

Aggressive health officers will be better able to show the result of their work.

3d. A stimulus will be given to tracing the source of infection.

4th. Rural and urban case rates will be more comparable.

The objections to the system are the following:

1st. One extra card for the health officer must be kept track of. The number of report cards can be reduced and a card adopted which corresponds more nearly to the card suggested by the committee that prepared the model state law for morbidity reports, so that the extra card will not be a burden.

2d. It will not be generally used. It will probably be used only by the aggressive health officers. They are the kind that should be assisted; the inactive health officers should not be encouraged to be less efficient.

3d. Border municipalities will not in some instances be able to transfer the cases that come from other states. Special provisions might be made to have these cases referred to the State Department, acknowledgment of which could be made.

4th. Case rates of different communities are like death-rates; not a good sanitary index, because corrections for age, sex, color, nationality, occupation, etc., are not made. Therefore, why try to repair a poor method?

It would seem that a poor method is better than none, and a poor method made a little better is a move in the right direction.

AN INVESTIGATION OF METHODS OF STORING AND DISPENSING MILK AND THE VALUE OF A PRACTICAL SCORING SYSTEM.

O. W. H. Mitchell, M. D., and G. E. Hannett,
Syracuse, N. Y.

SO MUCH has been said and done regarding the production, handling, and standardization of milk, the examination and care of dairy herds, that the importance of methods for dispensing milk in establishments outside the home has been largely overlooked. The enormous sale of milk in lunch rooms, hotels, restaurants, soda fountains and places of a similar nature, suggested to the writers that an investigation of storing and dispensing methods in these places might reveal conditions which should be remedied. The result of an investigation which was made in Syracuse is the reason for publishing this article.

During the summer and fall of 1914 inspections of 46 hotels, restaurants, lunch rooms and other places where milk is served were made. During the investigation special efforts were made to ascertain the methods used in storing and serving milk, to correct improper methods, and to formulate a practical scoring system for the rating of the methods employed in the storing and serving of milk.

The scoring system which has been used and is embodied in this report was made as simple as possible and the grading limited to what was considered the most important points in the storing and serving of milk, namely, the milk container, age of milk, refrigeration and care of the refrigerator. It would be easy to elaborate upon the system but to incorporate all of the things which suggest themselves would make a system too cumbersome and technical to be of practical value.

In the system employed the perfect score is 100. If a score is 80 or below there should arise a doubt as to whether the milk is being properly handled. In most instances a score of 75 is not acceptable. If the score is below 75 or an uncovered pail is used (even though an approved dipper is provided) there should be no hesitancy in refusing to allow milk to be served under such conditions. The scoring system is arranged so that credits given for the cleanliness of the refrigerator and the kinds of containers are variable. If a passing score is to result the credits for cleanliness of the refrigerator and kinds of containers must be high, or the score for one must be high if the other is low. A glance at the score will make the preceding statement clear.

Of the 46 places investigated the scoring resulted as follows:

Score	Number of places.	Per cent. of total number of places investigated.
100	5	10.86
95	12	26.08
90	5	10.86
85	3	6.52
80	14	30.43
75	5	10.86
Below 75	2	4.34

FAC-SIMILE OF SCORE CARD.

Name..... Day Number.....

Address..... File Number.....

Sample.....

Date and Hour..... Score.....

Milk containers.	Age of milk.	Refrigerator.	Care of refrigerator.
Bottled Milk (25) —	Not over one day after delivery (25) —	Temperature of 50°F. or below (25) —	Cleaned daily (25)—
Small-top pail and cover (15) —	Over (0) —	Over 50°F. (0) —	Often (20) —
Large top pail and cover (5) —			Occasionally (10) —
Approved dipper or equivalent (5) —			When needed (0) —
Uncovered containers (0) —			

Remarks—

Unsatisfactory or questionable scores were made by 7 places or about 15 per cent. of the places investigated and passing scores which were not highly satisfactory were made by 14 places or about 30 per cent. of the total investigated. Such a showing was considered good because little had been done previous to this investigation to improve the methods of storing and serving milk. The greatest courtesy was shown by proprietors, and they seemed very willing to adopt any reasonable suggestion offered.

Bottled Milk.—The number of places using bottled milk exclusively was 5. In the scoring system there is a difference of 5 points between the covered small-top pail with approved dipper and bottled milk. If the milk in bottles is not kept properly cooled, that is, if the bottles are frequently removed from the refrigerator and allowed to remain varying lengths of time in a warm room, the 5 points difference is not deserved. Of the places using bottled milk this practice was observed several times. Unless the bottle is shaken before the milk is poured out, the milk is apt not to be as uniform as dipped milk. Another practice which deserves some scrutiny is the serving of milk in bottles to customers. If the milk is obtained from the producer in bottles, the practice is to be encouraged but, as was observed in one instance, if the milk is bottled in the kitchen and served to the customer, the practice should not be permitted. Besides being a deception, the chances of contamination are increased by extra handling.

Milk in Regulation Milk Cans, Pails, Pitchers, etc.—Unquestionably the best method of handling and storing milk which is not kept in the original bottles is accomplished by the use of regulation milk cans supplied daily by the dealer. Next of value is a can of similar type which is kept at the place where milk is served and is cleaned daily. The chief objections to containers with spouts or faucets are that they are not infrequently poorly cleaned, and that the cream which collects on top is not mixed with the bulk of the milk so that some of the customers do not get value received.

The use of uncovered large or small-top pails, flaring top pails, pitchers, cans or jars is not to be recommended. It is very important that covers be kept on the cans to keep out dust, dirt, flies and other insects, particles of ice, small bits of various kinds of food and to keep the milk better refrigerated. During the busiest hours it is practically impossible to keep the cans covered, but there is no excuse for them being uncovered between rush times.

Use of Approved Dipper.—Milk should not be permitted to be served from containers other than the original bottle unless an approved dipper or some approved method is used to remove the milk from the can. By an approved dipper is meant a long-handled dipper which reaches within an inch or two of the bottom of the can and has a hooked handle which may be hung upon the side of the can. It is also very advisable that the dipper be free from cracks or crevices which easily collect dirt. The dipper is to be used as a mixer as well as a dipper.

During this inspection many substitutes for approved dippers have been found. They were in most instances short-handled dippers and various kinds of cups. By the latter methods the hand will frequently come in contact with the milk and besides such dippers cannot be used for mixing. The removal of the dipper from the can and leaving it on a table, hanging on a nail or rinsing in water are practices which should be stopped. As long as the dipper is clean and is not in use it should be left in the can. The dipper should be cleansed and sterilized daily.

Mixing of New and Old Milk.—At only one of the 46 places inspected was there an admission that milk of the day before had been mixed with the milk received on the day the inspection was made. Although apparently rarely practiced it should be called to the attention of proprietors that milk does not keep so long or have such a pleasant flavor when milk of different ages are mixed.

Collection of Dried Milk Above Cans. In order to save space the milk cans are not infrequently placed under counters or similar constructions so that projecting above the top of the can is the under surface of the counter or ledge. When the dipper is forcibly sent to the bottom of the can, milk is splashed on the under surface of the counter or ledge. Here it is often allowed to dry and sour. It will then scale off and drop back into the can when the cover is off. Such a condition causes a bad odor, gives rise to rapid souring and imparts a disagreeable taste to the milk.

Refrigeration.—The different kinds of ice-boxes, refrigerators, and coolers are so numerous that no attempt has been made to classify them. Any method which allows the temperature to rise over 50°F. or is uncleanly is not to be recommended. Keeping the bottles or cans surrounded with ice is undoubtedly the best method and rather easily accomplished. In all probability many of the so-called refrigerators in which the milk is kept in compartments a considerable distance from the ice frequently have a temperature over 50°F. It has been suggested that the expression "low temperature incubators" would be more appropriate for many refrigerators. In only one instance during this investigation was the temperature found unsatisfactory. Cleanliness of the refrigerator or cooler is very important in the storing of milk and in the method of scoring much emphasis has been placed upon this feature.

Summary.

While the results of this investigation reveal no startling insanitary conditions, they are enough to warrant close inspection of the methods of storing and serving milk in public places. A scoring system, such as the one employed, is a convenient way for keeping the record of the different places and is an incentive for the proprietor to improve conditions. By making frequent investigations and calling attention to needed improvements the methods of storing and dispensing milk may be easily brought to the same high standing as the methods employed by producers and distributors of milk.

REPORT OF COMMITTEE ON STANDARD METHODS OF TESTING DISINFECTANTS.

Earle B. Phelps, *Chairman.*

Laboratory Section, American Public Health Association, Rochester, N. Y., September, 7, 1915.

AN INFORMAL meeting of the Committee was held in New York on March 17, 1915, which was attended also by representatives of various laboratories interested in the testing of disinfectants. A plan was outlined tentatively for a comparative test of the two principal methods of standardization, the Rideal-Walker and the Hygienic Laboratory methods, with certain variations in technique. This plan was submitted in writing to the full Committee, and was subsequently carried out. Two samples of disinfectant having coefficients of approximately 5 and 15 respectively, were distributed, together with a standard synthetic phenol and a standard Hopkin's typhoid.

The results of the investigations have been tabulated and analyzed and have shown the necessity for more work along this line. The Committee therefore asks to be reappointed to continue this work.

SOME OBSERVATIONS ON THE MILK SITUATION IN THE SOUTH.

B. L. Arms, M. D.,
Department of Preventive Medicine, State Medical College, Galveston, Texas.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 2, 1914.

I HAVE purposely selected a title that would allow plenty of freedom, which would neither confine me to one phase of the situation nor necessitate taking up any particular part of the subject.

The essential cause of a difference between the conditions governing the situation in the South and in the North is the temperature. On the other hand, a great percentage of the milk is delivered within four to ten hours after production.

I have taken Galveston as a location and the counts in 1914 up to July 6, as these were all made by the city bacteriologist, consequently by identical methods. Those during the latter part of July and during August, being made during her absence, have been omitted.

The maximum temperature at Galveston during the year 1913 was 99 degrees, minimum 27 degrees, the average 68 degrees. For the first eight months of 1914 the temperature was:

TABLE I.

TEMPERATURE FIRST EIGHT MONTHS 1914.

	Maximum.	Minimum.	Mean.
Jan.	73	38	57
Feb.	73	27	52.8
Mar.	72	40	57.2
Apr.	76	44	66.7
May	82	62	74.6
June	94	73	82.3
July	94	74	83
Aug.	88	69	82.2

TABLE II.

TEMPERATURE RANGE FIRST EIGHT MONTHS 1914.

	Mean highest.	Mean lowest.	Greatest daily range.	Least daily range.
Jan.	62.4	51.5	24	4
Feb.	59.	46.6	27	3
Mar.	62.1	52.3	23	3
Apr.	70.9	62.5	16	4
May	78.1	71.1	14	3
June	86.7	77.9	17	6
July	87.5	78.6	18	4
Aug.	86.3	78.1	16	5

These figures as well as those on the humidity were furnished by the local forecaster, Mr. W. P. Stewart, to whom I wish to express my thanks. It will be noticed that the daily range must be, as a usual thing, very slight. During one eight-day period last summer, the mercury at no time registered below 81°, the maximum for this period being 89°, the daily average being 84° on each of two days, 85° on five days, and 86° one day. In spite of this condition, there was practically no ice used on the delivery wagons. I saw none on any, although nearly all the dairymen use ice to cool the milk on the farm. Notwithstanding the climatic conditions, I am informed that there is but one city in Texas—San Antonio—that has a temperature regulation for the control of its milk supply.

The city of Galveston is situated at the eastern end of Galveston Island, which is about thirty miles long by one to three miles wide, and is separated from the mainland by Galveston Bay which varies in width from two to forty miles. The entire island is very flat and low. Following the disastrous storm of 1900, which was so destructive to both life and property, the great sea wall four miles long was built on the Gulf side to protect the city from future damage and the grade was raised to 17½ feet above mean low tide. This grade slopes very gently toward Galveston Bay on the north side of the city.

The island is connected with the mainland by a concrete causeway nearly two miles in length and sixteen feet above mean low tide. The mainland, for fifty miles inland, is low, very few localities being over fifty feet above sea level. Consequently much of the territory is not easily drained and there are many marshes. Under these conditions, of course the mean relative humidity is high. The figures for the first eight months of 1914 follow:

TABLE III.

HUMIDITY RANGE FIRST EIGHT MONTHS 1914.

	Range.	Days 80 or above.	
Jan.	50–98	16	
Feb.	52–98	16	
Mar.	56–100	18	5 days 100
Apr.	61–98	25	
May	57–96	24	
June	71–84	12	
July	74–89	21	
Aug.	72–92	11	

About 35 per cent of the milk consumed in Galveston is produced on the island within a radius of nine miles of City Hall, the other 65 per cent. coming from the mainland, all of it within a radius of 25 miles. The milk from the mainland is shipped without ice and delivered twice a day, while that produced on the island is also delivered morning and afternoon.

Of nineteen dairies on the island, ten delivered a product averaging below 100,000 for the period under consideration, the number of samples examined from each dairy varying from 5 to 13; three more were below 120,000; two between 150,000 and 175,000; one average was 267,000 (11 samples), but had it not been for two high counts this would have been in the first class as the average of the other nine was 23,000; the next had an average of 665,000; the next had an average of 1,061,000 with but a single sample out of eight below 125,000, and the last was an average of 1,252,000 which was caused by two extremely high counts, as the remaining six samples averaged 26,000.

Of two distributors handling milk from the mainland, one had an average from six samples of 842,000. Six samples of this milk taken at the railway station on arrival, but on different dates, averaged 397,000. Thirteen samples from the other distributor of mainland milk averaged 1,317,000 on delivery, while 47 samples of this supply, exclusive of five which were designated as having innumerable bacteria, averaged 716,000 on arrival. These being the laboratory findings let us look for the causes.

An inspection of the dairies whose product shows a consistently low count reveals, as one would expect, clean stables, clean milk-rooms, and clean utensils, with attention paid to the cooling of the milk and the absence of flies.

At one of the dairies in this class we find that the dairyman is making use of an old stable, but it is kept scrupulously clean, the milk-room is clean and screened, and although there are no screens in the stable, there are absolutely no flies. At one dairy at the time of the writer's visit, it was found that the milk utensils were washed in a portion of the barn, separated from the stable by a short passageway, without doors, and the pails and strainers were literally covered with flies which may have shortly before been in the stable. All water for the washing process was heated in a kettle out of doors. At this place a detached milk-room was in process of construction.

At another dairy they were milking, and although there was a milk-room just outside the stable in a separate building, they were straining the milk in the stable just back of the cows. Needless to say, each of these dairies had a high bacterial average.

While I have not been able to visit the dairies on the mainland, I have the information from different sources but trustworthy ones, that they are, as the counts would indicate, in an insanitary condition.

The bacterial count should be used as an index of the manner of producing and handling milk, and when a high count is found the cause should be sought, as it indicates that there is a slip somewhere. An inspection will locate the trouble and a recount should be made to determine if it has been remedied. A combination of counts and inspection is of the greatest benefit to the producer as well as to the consumer, although some of the former do not so consider them.

That this is feasible has been demonstrated most conclusively at Richmond, Va., where the milk inspector is in close touch with the dairies, also in other cities to a more or less marked degree. Of course, in large cities, where the milk is obtained from a wide area it is not as easy, but still it is being successfully done.

If, after the cause is found, the dairyman refuses to rectify it, the proper course is to refuse to permit the milk to be sold. Recourse to this procedure has a very wholesome effect not only on that individual whose license is taken away but also on others, as no one desires to be even temporarily denied a market.

There should be a temperature regulation for the sale of milk, and with ice at thirty cents a hundred there is no excuse for not using it. A low temperature, as well as pasteurization, is not to be used as a substitute for cleanliness in production and handling, but as an aid in delivering a clean, wholesome product.

If milk is produced and handled under proper sanitary conditions and kept cold there is no reason why the milk problem should be greater in the South, or at least where ice can be procured at a reasonable price, and this

is the rule rather than the exception, than in the North, and there is the advantage of having the source of supply near the consumer.

As soon as the consumers take sufficient interest to know, from personal observation, the conditions under which their milk is produced, and insist on proper methods of handling, they will get a clean supply.

Discussion.

Dr. Chas. E. North (*New York*): I am surprised that the figures in Doctor Arms' paper indicate the milk supply to be in such a good condition in a city where the climate is somewhat warmer than in other parts of the country. I consider it to be another evidence of the fact that cleanliness will produce clean milk under almost any geographical condition. I think we are all rapidly coming to realize that the production of clean milk is not a difficult matter but an easy matter where there is a real, conscientious intention to be clean. I would like to supplement that thought just for a moment by citing from my experience some principles which I believe should be emphasized in the minds of all health officers on this milk question. First, I feel that the establishment of a bacteriological laboratory by every municipality for the testing of milk supplies is a primary essential in their control. Second, I believe the industry should be encouraged to establish their own laboratory for keeping control over their producers and the different steps in the handling of milk; just as a social worker can go into a poor district of a city and in a short time bring about a tremendous reform in tenement houses and in the conditions of living among those people, so can a sanitary expert go into a dairy district where dairy farmers are producing milk for large cities and in a very short time supervise and instruct those producers so as to transform milk which may have contained millions of bacteria into milk containing a very few thousand. That is being so repeatedly illustrated now, that the industry is rapidly learning the value of substituting for ordinary commercial men in charge of their shipping stations, men with some degree of sanitary training who can take supervision over the activities of milk producers. Now, the feasibility of that plan of producing clean milk for large cities justifies the establishment of grades and standards for the control, by regulation, of the milk supply, because certainly it is an injustice to a clean producer to label his product with the same label that the milk of the dirty producer is labeled, and it is an injustice that it should be dumped into the same tank and sold for the same price. We are met with the argument that so long as milk is safe by pasteurization, we should not inquire too closely into its origin. I feel that as persons interested in public health, we are justified in putting forward claims of decency as fundamental, and that what may be called the pleasure of life or of drinking our milk or eating our food is sufficient justification for insisting on a distinction being made between two articles equally safe, but one of which is decent.

Dr. McCormick (*Asheville, N. C.*): I want to endorse the sentiments of Doctor North and Doctor Arms regarding the invaluable health aid to the milk inspectors and milk officers, of the laboratory. I had the pleasure of meeting Doctor North and Doctor Arms at Cortland at the meeting of the Milk Committee, and that has been invaluable to me in my inspection. I find also that the thing which we have found applicable from a laboratory point of view tended to the simplification of milk production. The milk pail itself is the basis; the milk pail I obtained in Cortland has been the basis of clean milk. I have to tell the dairyman God would never forgive me for recommending a strainer, and I tried to get them to cut it out. When I was first milk inspector I taught them to strain milk and I hope God will forgive me for ever telling them to strain the milk. Keep it clean. You cannot wash milk: you cannot take the dirt out after it is once there. I found my laboratory most valuable in teaching the dairyman the size of bacteria and how utterly impossible it is to get them out with a strainer, and they go back thoroughly persuaded that you cannot strain bacteria out of milk and that milk,

once dirty, is always tainted. A closed pan—and I know none better than that designed by Doctor North—is the prime essential of clean milk.

Dr. G. E. Goler (*Rochester*): I agree for the most part with what Doctor Arms has said. I can add one important thing to the discussion, that is the value of keeping milk cold. Many men are deterred from building ice houses because of the expense of ice and because ice does not keep in the ice houses they do build. For many years it has been our custom to build an ice house. We use the Rochester Ice House. It can be built for $60, not including the cost of labor, and will keep ice so perfectly that after the lapse of five or six months, you can take ice out of this ice house with the snow upon the ice, just about as you put it in in the winter time. I am not here to advocate or advertise magazines, but that ice house, as well as a combined fireless cooker and icebox that can be built for $4.00, will run a family of five, keep food cold for five days, with an expense of 50 pounds of ice, and it will be described in the January number of *Good Housekeeping*. I should say that ice house holds 50 or 60 tons of ice and can be built for $50 or $60.

Dr Chas. J. Hastings (*Toronto*): I don't think one can emphasize too highly or too much the significance of refrigeration, but it has been wisely pointed out that we must have clean milk to begin with; we must get clean milk. It is not a matter of making it clean afterwards, and after all, the human conscience, while we appreciate it very much, yet we find that there is more conscience in a great many people lurking in their pockets than there is in their hearts, and in the better part of them, therefore you have to appeal to the pockets very often, or do something that will affect their pockets in order to properly appeal to their conscience. Now, if you absolutely prohibit, by your dirt test, which is one of the best and most efficient methods of controlling it, because you cannot always watch the methods of production, but by using the dirt test you can decide for yourself whether that milk has been produced under reasonably sanitary conditions or not; then if it has not, either dump it into the sewer after you have tried that test or return it again after coloring it. Our method at Toronto was at first to dump all milk of that kind into the sewer. We dumped a good many hundred gallons the first year of our campaign into the sewers, and it had a very desirable effect; then the objection was made that if we had sent that milk home, they could have used it for feeding to the hogs. We were a little bit doubtful whether people who would send dirty milk to the market would feed it to the hogs after it was sent back, so we secured a coloring matter that would color it a beautiful pink color, so that even if an 8-gallon tin was diluted with another 8-gallon tin, it would still have that pink color, so we color it and put on a large red label stating that it is unfit for human consumption, and return it. Of course the man gets the benefit of that advertising while the milk is being returned. Another important method is advertising the standards of the different dairies in your municipality. I don't know of anything that will create a clamoring among dairymen and vendors alike quicker than publishing a list of the standards of different dealers, and they will endeavor very avidly to get into that list, because their clientele will very soon begin to inquire why they are not on, and occasionally those that have been on are dropped off and it becomes intensely interesting to see how they will scramble to get back. All these things are important and we should demand clean milk so far as barring contamination is concerned, but we must remember that clean milk may be far from bacteriologically clean. We must also remember the danger of tuberculosis in the herd, the danger of bovine tuberculosis so far as children are concerned, and which is responsible for about 26 per cent. as our experience tells us; therefore we should get milk that is absolutely clean from barnyard contamination and then make it bacteriologically clean by scientific pasteurization.

MORTALITY STATISTICS AND THE PHYSICIAN.

GEORGE H. VAN BUREN,
Bureau of the Census, Washington, D. C.

Read before the Vital Statistics Section, American Public Health Association, Jacksonville, Fla., December 2, 1914.

THE chief value of mortality statistics is (or should be) in their presentation of deaths by causes. The compiler is chiefly dependent upon physicians for the proper statement of causes of death on the death certificates which he must use as the basis of any matter that he publishes. Unless the physician gives this information in such a way as to describe all of the known morbid conditions that caused the death of his patient, it is evident that, no matter how well-ordered and painstaking may be the statistical system of the compiling office, the value of the published results, as being representative of actual rather than reported conditions, will be seriously affected.

Our statistics of deaths are compiled *as reported*, and unless vital statisticians "go behind the returns" in efforts to obtain corrected statements, it is a certainty that the incompleteness of some reports must lead to the assignment of many deaths to statistical headings under which they *do not* belong and the consequent failure to assign such deaths to the titles to which they do belong.

The great majority of you gentlemen who are members of the Section on Vital Statistics have had practical experience in the compilation of statistics of causes of death; you have been "behind the scenes," you have worked with death certificates with a view to the translation into cold figures of the returns of causes of death reported thereon; and you realize that such figures, based upon the data we have been and are receiving, are far from being representative of actual conditions. To me it seems that the registration and compiling offices of today should devote more time and energy to getting in touch with the physician, for the physician is the fundamental source of our data. In other words, those who are responsible for published figures of causes of deaths should bend every effort toward bringing the reports into closer relation to the facts. Every possible effort should be made to let the physicians know what we want and why we want it. It is my contention (and this is supported by thousands of replies to letters sent to physicians by the Division of Vital Statistics of the Bureau of the Census) that in the great majority of the cases the doctors are able and willing to supply the information needed for correct classification; the reason that it is not given in the first place in so many instances being that they do not realize the necessity for giving it.

A great and fundamental defect in our mortality statistics is due to the fact that the material used in their building is material intended for other purposes. No one who has "edited" reports of causes of death as they ap-

pear on the certificates can have failed to observe that in very many cases our physicians do not write them with any thought of their use for statistical purposes. Hence the need—yes, the necessity—of carefully planned, comprehensive effort to bring home to our physicians the necessity of full and accurate description of the cause of death, if known.

The Bureau of the Census has been working along these lines for years. In 1903 it published a circular on the "Relation of Physicians to Mortality Statistics." This pamphlet contains an arrangement of the titles of the International Classification of Causes of Death (first revision) with explanatory notes in the form of reminders of errors that are apt to be made in reporting deaths from certain causes. As an example, the physician is asked to remember, by a comment following title number eight (whooping cough) that "In deaths from bronchopneumonia *following* whooping cough, the primary cause should invariably be stated." The pamphlet also contains a "List of Indefinite Terms Frequently Used by Physicians in Stating Causes of Death, but Which Should be Avoided." This list comprehends over 200 of these expressions and following each one there is a statement of the further information required for proper classification. This circular was sent to every physician in the United States and the effect was most excellent, as many doctors manifested their appreciation by making their certificates conform to the suggestions noted. In several other pamphlets issued by the Bureau of the Census and in the text of several of its annual reports the importance of full and accurate statements of cause by the physician is discussed.

While all of these efforts have been rewarded by improved data, the experiment of direct communication with the physician as conducted by the Bureau of the Census in 1912, the results of which were published in Mortality Statistics, 1911, has proven to be most satisfactory and has indicated the method of procedure, which, in my opinion, will, if carried out each year, be instrumental in raising very appreciably the standard of our mortality statistics. Five terms commonly reported as causes of death were selected, and letters were sent to the signing physicians enclosing copies of the medical certificates of death and asking for any additional information that they could supply which might assist in the classification of the causes. Replies were received to 71 per cent. of these inquiries; almost invariably they were courteous in their tone and many of the physicians took occasion to thank the Bureau for calling their attention to the incompleteness of reports which they had believed were sufficiently specific. The five expressions selected as a basis for the experiment were "meningitis," "paralysis," "convulsions," "pneumonia," and "peritonitis." As a result of the additional data furnished the Bureau the net change in the classification of the cases about which we communicated was 57.1 per cent. The most notable changes were those in the "meningitis" cases of which 85.9 per cent. were assigned to other titles as the result of

what the physicians told the Bureau in answer to these inquiries; the replies to the "peritonitis" inquiries brought about different assignments for 77.5 per cent. As noted in the discussion of the experiment (Mortality Statistics, 1911, pages 36 to 38) the results indicated that several of the epidemic diseases, together with conditions like tubercular meningitis, tubercular peritonitis, diarrhea and enteritis (infantile) and other diseases were not being charged with hundreds of deaths of which they were primary causes. The experiment was most interesting in that in almost all of the cases the changes were *real corrections,* as exemplified by a return of "peritonitis" being amended by the statement "due to perforation of gastric ulcer," or a report of "pneumonia" being changed to "bronchopneumonia following measles." The number of replies received was less than 2,000 and, possibly, deductions based upon so small a number may be considered as subject to revision. Personally, I believe they are fairly representative. During 1914 the experiment was conducted on a much larger scale, and while the replies to the letters of inquiry have not been assorted and classified at this time, I believe that when this is done it will be most conclusively demonstrated that correspondence with the physician, when his description of the cause of death is unsatisfactory from a statistical standpoint, will result in the classification each year of many thousands of cases under titles not mentioned on the original certificates. By keeping everlastingly at it, the educational effects are bound to improve our statistics of causes of deaths. This plan of direct communication has been successfully carried out by the office of the Registrar-General of England and Wales, the Statistical Bureau of the Metropolitan Life Insurance Company, and (I am informed) by one or two of our state registration offices.

There are, of course, many errors in the statement of cause which it does not lie within our power to correct; notably, many cases of sudden death in which we must depend upon inquest findings; cases where physicians are called when the decedent was moribund; cases in which but one call was made and the patient died days or weeks later, thus affording little opportunity for accurate diagnosis; and lastly the admittedly large number of cases in which diagnoses, based upon clinical findings alone, are incorrect. It is impossible to estimate the proportion of all the cases which these classes constitute. At any rate, they are conditions that we cannot remedy. We are more interested in the class of errors which we can correct and prevent. The fact that stands out is that we can raise our standard of accuracy merely by asking the physician for information that *he is able and willing to give us,* and at the same time point out to him an error of omission, which he will be glad to correct and will be unlikely to repeat if he has occasion to write another certificate covering a similar case.

In this connection it should be borne in mind that the death of the patient—an event which to the vital statistician is the basis of a few items for classifi-

cation—is chiefly significant to the physician as the end of a losing battle against disease or injury. It is rather to be expected that the doctor—who is not a statistician—and whose efforts, probably, during the few days or hours immediately preceding his patient's death, have been centered upon combating a fatal *complication* of the primary trouble, should have the terminal condition uppermost in mind when writing the death certificate, and fail to note thereon the cause which was primary, and the one of statistical significance. Is it not, then, the duty of the statistician, whose aim should be to present the closest possible approximation of *actual* (not reported) conditions, to take advantage of the proven willingness of the physician to correct his unintentional errors of omission?

It may possibly be contended that if the scope of our inquiries to physicians were extended to cover reports of conditions included under those titles of the International List of Causes of Death to which additions are made on the basis of the information conveyed in the replies received, the additions would be practically neutralized by deductions. In other words, it may be suggested that if letters of inquiry covering every reported death were sent out, all errors of statement would be found to be approximately compensating in accordance with the so-called "Law of error." It will be fully appreciated, however, by those whose experience in compiling mortality statistics has been fairly extensive, and by any medical man who chooses to give the subject consideration, that there is no place here for the application of this law. The reason is simple: The basic data are not equally amenable to misstatement. Given 5,000 returns of whooping-cough and 5,000 returns of diphtheria, we feel quite confident that the *primary* cause is before us for compilation, and that if not, there is no more reason to expect a report of whooping-cough in a case of diphtheria than there is to expect one of diphtheria in a case of whooping-cough. Here applies the "Law of error," for there is reason to believe that any such errors will counterbalance. But it will be evident to all that if 5,000 returns of appendicitis and 5,000 of "peritonitis" (its most frequent fatal complication) are received, in the great majority of the "peritonitis" returns *the primary cause is not before us for classification*, since peritonitis is seldom idiopathic, and it will be no less evident that there is more reason to believe that there have been many statements of "peritonitis" when appendicitis was really the primary cause than there have been of appendicitis in cases of idiopathic peritonitis.

In several of the replies received to the inquiries sent out by the Bureau of the Census in 1914, physicians have stated that they would have given data describing the sequence of events, if the space allotted to causes of death on the Standard Certificate of Death had been sufficient to permit giving details. In this connection, I suggest that the vacant space on the reverse side of the certificate could well be devoted to the *case history*, with an admonition in the form of an amendment to the note following the present cause

of death space to: *Add in the space marked ease history on the reverse side any other data relative to the cause of death that will aid in classifying it.* There is no doubt that this would elicit information which would form the basis for correct classification of many deaths which are now incorrectly assigned on account of non-statement of the primary cause.

During the month of October the state registrar of one of the states of the registration area, while visiting the Census Division of Vital Statistics remarked that he had observed the beneficial effects of the census inquiries in his state. He told us that several of his physicians had written him telling of the receipt of our letters and gave it as his opinion that this method was sure to bring good results.

The great majority of our physicians are willing to coöperate with the vital statistician; they are willing to report causes of death in such a way as to insure their classification under the proper headings; but many thousands of them do not know that many of the terms they have been using for years are not acceptable to the statistician for the reason that these terms admit of more than one interpretation and necessitate *guesses* as to what really caused death, when, as a matter of fact, the physician could just as well have described the case in such a way as to insure its correct classification. I do not believe that the average doctor who writes "pneumonia" *or* "cancer" *or* "Meningitis" *or* "cardiac dilatation" or scores of other terms in more or less common use, has any thought but what they will be acceptable in every sense, and yet we all know that to the statistician who wants to give to the public figures with reference to the disease of which the "pneumonia" was the terminal symptom, or to publish tables showing deaths from cancer according to the seat of the disease, or to segregate deaths from *epidemic* cerebrospinal meningitis, such expressions are indeed "thorns in the flesh."

As a very prominent American vital statistician has stated, "the validity of the statistics cannot rise above the authority of their source," but in this country, where comparatively few deaths are certified by non-medical men the physician is practically the sole source of our data in regard to causes of death, and we need but acquaint him with the expressions that are unsatisfactory from the standpoint of the statistician to get him to disuse many of these common forms of reporting causes of death that are so unsatisfactory, vague, and indefinite.

Let us use every means in our power to impress upon our physicians the statistical mission of the death certificate! There is no better way than by concrete example. Show him what is wanted and wherein he has failed to supply it. Send him in connection with your inquiry any literature you publish bearing on the subject of classification of causes of death. The result will be that after a few years there will be no necessity for the validity of our mortality statistics to "rise above the authority of their source," for we want no better source than the American physician who has the proper opportunity to diagnose his case.

REPORT OF THE COMMITTEE ON ORGANIZATION AND FUNCTIONS OF MUNICIPAL HEALTH DEPARTMENTS.

JOHN A. VOGLESON, *Chairman.*

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 2, 1914.

YOUR Committee in its three previous reports has dealt to a large extent with general surveys of the Organization and Functions of Municipal Health Departments, as they are constituted in municipalities of the four countries represented in this Association. The report of 1911, published in the JOURNAL of the Association for May 1912, in addition to its summarization of how the health departments reported upon were organized and of the functions they were performing at that time, gave a constructive suggestion for the general conduct of the municipal health work.

The Committee for the year 1914 has thought that it could best serve the Association by taking up one of the general statements of the report for 1911 for examination in detail with the view of ascertaining the possibility of further constructive effort. It has, therefore, selected Regulations Governing Plumbing and House Drainage for the subject of this report.

In consideration of our subject, the first question to be answered is an important one, namely,—To what extent are health officers charged with the formulation or administration of plumbing and house drainage regulations? A brief survey has, therefore, been made of available Plumbing Codes and from that examination we compiled the following information:

CODES EXAMINED—125, representing a population according to the Census of 1910 of approximately 24,000,000 persons in cities of the countries represented in this Association. In 80 cities, representing 56 per cent. of the above population, the health authorities are directly charged with administration of functions related to regulation of plumbing. In 33 cities, representing 40 per cent. of the above population, the administration of plumbing regulations is lodged with boards, bureaus or departments of buildings, works, control, etc., and we have designated such supervision as engineering control. In the remaining 12 cities, representing 4 per cent. of the population examined, the administration is lodged with the "plumbing inspector." Of the codes examined, they were adopted either by state legislation, local ordinances, or by boards charged with the duty of making plumbing regulations. We probably do not make an essential error in assuming that the ratios determined from the codes examined are fairly representative of general allotment of the administration of plumbing regulations among the several municipal departments as generally constituted. Leaving aside, then, consideration of

all questions except those of executive control, we find that health officers are in the main charged with this function. For that matter, in codes made and administered by other than health authorities, practically all carry a subcurrent of influence by such bodies or considerations of health. The most recent legislation of broad significance, enacted on the subject under consideration, places the authority for making plumbing and house regulations with state health authorities.

In the general examination of codes, we find great diversity of practice and equipment required, and a lack of standardization of materials entering into plumbing work. This diversity appears particularly in the matter of ventilation of the drainage system and again the regulations governing traps. The principles underlying the design of a satisfactory system of house drainage are in the laws of physics. Physical phenomena vary with climate, latitude, altitude and other geographic factors, but the variations in plumbing regulations do not appear to vary in accordance with changes in physical phenomena in so far as they are known to your Committee. Some cities require much more complex systems of plumbing than others, and we find from time to time in the press, and almost daily in the administration of our duties as health officers, that the public mind is still possessed with the idea that sewer air is a specific cause of disease.

The healthfulness of workers in the sewers of Paris is oft referred to in discussions of this subject, and the investigations of Professor Winslow into the bacteriology of sewer air are now well known. There is now extant a large fund of reliable data on experiments and investigations in plumbing and drainage, and to the literature on this subject there was added in 1912 a most interesting report rendered to the English Parliament by a committee appointed to investigate the use of intercepting traps, from which we quote a statement as to the results of an investigation by Doctor Turton in the city of Leeds.

"Table I, which summarizes the results of his investigation, shows that the proportions of defective drains in houses invaded by typhoid fever, or diphtheria, and in houses not invaded by disease, were 27.94, 27.88, and 27.30 per cent. respectively, or practically the same in all three classes of houses."

In the matter of equipment required, we find tables in various Codes which do not conform to varying climatic conditions, and again there is considerable variation in their requirements for mechanical practice. In mechanical practice plumbing codes are directly related to the problem of water waste which confronts practically all cities, especially in the United States. Many of our large municipalities have expended large sums of money for supplying purified water. Without exception, all of these cities are bearing heavy financial burdens on account of water waste. Health officers did much toward bringing about the benefits that are accruing from improved quality of water supplies, and through their control over water using fixtures they still have something to do in assisting to secure an economic adjustment of the

TABLE I.

	No. of houses examined.	Drains.	
		Defective.	Not defective.
GROUP I. House to House Inspection	2,275	621 27.30%	1,654 72.70%
GROUP II. Houses Invaded by Typhoid Fever	1,428	399 27.94%	1,029 72.06%
GROUP III. Houses Invaded by Diphtheria	3,914	1,092 27.88%	2,822 72.12%
Total	7,617	2,112 27.73%	5,505 72.27%

financial burden imposed. And further, the controlment of water waste will not only benefit the cities which have incurred the expense of securing potable water but it will also permit the necessary expenditures for this purpose to be brought within the financial ability of communities which still suffer from lack of good water.

The lack of standardization appears in the requirements for some of the commonest fittings. We have noted variations in the weights required for soil pipe when called for under specific names, such as standard, medium and extra heavy. While in soil pipe itself the variations noted were not great, yet in the fittings which go with the pipe and form an essential part of the drainage lines, we find a complete absence of control except in a few of the Codes of very recent date where notice has been taken of this omission from previous Codes and the defect corrected. To illustrate, we have computed the per cent. variations of the weights given for some of the quite common fittings which were purchased on the open market and weighed by investigators of this form of plumbing supplies. (See Table II.)

This variation may have been due to variation in length of fittings as well as to variation in thickness of shell but members of your Committee have personally examined some such fittings which had a thickness of shell of less than $^1/_{16}$ of an inch on one side and a scant $^1/_8$ on the other. The tendency of this variation is to affect both durability and cost. With the thin-walled fittings, the durability desired may not be obtained, and the variations in weights will surely influence the cost of the work with the probability that the cost of the maximum

weight fittings will be in general control, and a higher cost for plumbing prevail.

Your Committee has endeavored to learn something about the cost of plumbing and secured from architects correct for the cost of plumbing and drainage work. It was also ascertained from a table published by the *Review of Reviews* that the estimated value of plumbing fixtures sold annually in the United States was $46,-

TABLE II.

VARIATIONS IN FITTINGS.

Standard.	Minimum.		Maximum.		Difference.		Difference is per cent. of minimum.
	lbs.	oz.	lbs.	oz.	lbs.	oz.	
4″ 1/4 Bend	9	—	11	1	2	1	22.9
4″ 1/8 Bend	4	12	11	—	6	4	131.8
4″ 1/16 Bend	4	8	9	4	4	12	105.5
4″ x 4″ San Tee	13	—	18	—	5	0	38.5
4″ x 4″ Y	13	—	17	8	4	8	34.6
4″ Long Sweep	13	4	20	—	6	12	50.9
Extra heavy.	**Minimum.**		**Maximum.**		**Difference.**		**Difference is per cent. of minimum**
	lbs.	oz.	lbs.	oz.	lbs.	oz.	
4″ 1/4 Bend	10	8	16	8	6	0	57.2
4″ 1/8 Bend	9	—	12	8	3	8	38.9
4″ 1/16 Bend	9	—	11	2	2	2	23.6
4″ x 4″ San Tee	17	—	32	10	15	10	91.9
4″ x 4″ Y	18	—	25	4	7	4	40.3
4″ Long Sweep	13	—	23	8	10	8	80.8

and builders an estimate of the percentage of the total cost of building, which is usually expended for plumbing and drainage. These estimates ranged from 5 per cent. to 10 per cent. and it would appear that generally speaking, 10 per cent. of the total cost of the building is approximately 387,100. This expenditure for general items entering into building construction is only exceeded, according to the estimate quoted, by that for paint and painting materials, bricks and structural steel. It may be asked, Of what interest is the cost of plumbing to health officers, and some may

consider that it is a problem for engineers rather than health officers. In large buildings the last consideration may be particularly pertinent, but in the many thousands of smaller habitations, particularly in our growing problem of housing, and in our ever-present problem of sanitary inspections and maintenance, the task is charged to the health officer by precedent, by general context of the laws enacted in the past, and by the trend of recent legislation.

It is the specific function of house drainage systems to afford a tight, substantial and direct conduct of liquid wastes or wastes in suspension from habitations, or other occupied places, to some properly arranged place of disposal, and to perform this function without nuisance. That system is best which accomplishes this comparatively simple requirement in the most economical manner. One of the needs of the day in this particular is a standard plumbing code, giving the minimum requirements for good drainage in order to permit housing requirements to be freed from the burden of intricate plumbing.

Not the least of the benefits of this Association is its influence in establishing methods for standard practice in health work. It has met with signal success in many lines of such endeavor, and your Committee most earnestly recommends that in this opportunity to bring about standard practices in plumbing and house drainage, particularly in the matter of minor requirements, there exists a still further opportunity for needed work. To that end we respectfully suggest that a Committee be appointed to prepare for submission to the Association at its next annual meeting, a draft of the Standard methods of the American Public Health Association for Plumbing and House Drainage.

The report was adopted.

REPORT OF THE COMMITTEE ON STANDARD METHODS FOR THE BACTERIAL EXAMINATION OF MILK.

COMMITTEE, M. P. RAVENEL, *Chairman;* H. W. CONN, W. H. PARK, JOHN F. ANDERSON, ROBERT S. BREED.

Read before and adopted by the Laboratory Section, American Public Health Association, Rochester, N. Y., September 10, 1915.

THE Committee has deemed it unwise to make a final or complete report at this meeting. One reason for this is that there are at present three committees appointed by different organizations, all of which are working on standard methods for milk examination, and it is our hope that these three committees can agree on a uniform method for use throughout the country. Since there are numerous duplications in the personnel of these committees, we feel that it will be entirely possible to accomplish this end. We beg, therefore, at this time to make a report of progress only. The recommendations which follow are for the routine analysis of milk only, and are not advised for scientific research work.

Samples.—Samples shall be not less than 10 cc., put into sterile containers and well iced. In taking samples from containers such as cans, etc., a straight-sided tube of glass or aluminum is to be used. The tube is to be inserted slowly, the top end not being covered with the finger until the tube reaches the bottom. It is then closed and the tube withdrawn. Stirring of the milk with the tube in the cans assists in obtaining a uniform sample.

Temperature.—If the temperature is required it should be taken after the sample has been removed.

Culture Medium.—One culture medium is recognized—agar made after the standard method recommended for water analysis, 1915 Report. This provides for the use of meat extract, three grams per liter, and best peptone available.

Reaction of Culture Medium.—If after titration the reaction is between 0.5 and 1. do not adjust.

NOTE.—It is easier to get a clear agar if the bouillon is filtered before adding the agar.

Dilutions.—For samples of unknown character dilutions of 1 to 100, 1 to 1,000, 1 to 10,000 shall be made using sterile water and pipettes after the ordinary method. In case the character of the milk is known, less than three dilutions may be made; but in no case shall less than two plates for each sample be made. Grade A, or its equivalent, should be plated in duplicate, and a dilution lower than 1 to 100 may be used.

Shaking.—Samples must be shaken twenty-five times. Shaking is defined as meaning a rapid up and down motion with an excursion of not less than one foot.

Pipettes.—Pipettes must be made to deliver between graduation marks, not simply to deliver.

Pouring Plates.—The melted agar must be poured promptly after meas-

uring out the proper quantities of milk. Not more than twelve plates must be allowed to accumulate after the distribution of the milk into the plates before pouring the agar.

Incubation and Counting.—One standard temperature only is recognized—48-hour incubation at 37°C.

If possible count those plates containing between 30 and 200 colonies. If there are none such, count those plates containing nearest to 200 colonies. The whole number of colonies on the plate shall be counted where the plates contain less than 200 colonies.

Counting Lens.—The lens recommended by the Committee last year is here more fully defined. It is known as Engraver's lens No. 146, Bausch & Lomb Catalog. It is designated as $3\frac{1}{2}$X, its magnification being $2\frac{1}{2}$ diameters. Persons who are nearsighted should wear their ordinary glasses while using this lens. Farsighted persons should use the lens without their glasses.

Sediment Test—If the sediment test is desired one of the forms of apparatus using filtration through a cotton disc must be used.

Time of Plating.—Milk should be plated as soon as possible after the collection of the sample. When not plated within five hours, this fact should be stated on the report.

Microscopic Examination.—Direct microscopic examination is now under extensive study and the Committee is unable to make any recommendation at present concerning its use, but hopes that it will be in a position to do so before the time of its next report.

Interpretation of Results.—This depends on the history of the milk, and the Committee is not ready to make any recommendation at present.

The Committee recommends that this report be adopted for the routine examination of milk during the coming year.

The Committee asks that this report be published and distributed for criticism and suggestions during the year.

Health Department Reports and Notes.

REPORTS.

Los Angeles.

The Report of the Los Angeles Department of Health for the year ending June 30, 1915, has just been received. It is an excellent report well illustrated with half-tone photos and a number of line plates showing the comparative prevalence of some of the communicable diseases for a number of years past.

The estimated population given in the report is 500,000, and on this basis the death-rate is 11.47. This is without deduction for non-residents. The infant mortality rate is given as 69.15 and of this, it is stated that 21.5 per cent. are due to prenatal causes. If this is correct, it is surely a very excellent showing. The birth-rate is 16.63.

Physicians are required to report cases of venereal disease by number. Four hundred and eighty-two cases were reported during the year. The report states that these returns are not satisfactory.

The milk inspection division is adequately conducted. It is reported that 80 per cent. of the milk supplied in Los Angeles is pasteurized. Restaurants are inspected and scored. The department's total appropriation for the year was $134,000; of this amount, $3,400 was not expended. The housing commission presents a very well written report profusely illustrated. The tenement house problem of the eastern cities does not seem to be acute but many ramshackle single houses were discovered which were unfit for human habitation. Conditions were improved in some of the crowded cheap lodging houses.

Manchester, England.

The medical officer of Manchester is obliged to report an increase in death-rate for 1914.

Following the letter of transmissal, the report opens with a statement of general statistics for the year from which it appears that the estimated population was 739,136, the death-rate 16.76, and the birth-rate 25.30.

The work of the department was increased during the year, largely from causes arising in connection with the war, and at the same time a number of its valuable officials were lost by enlistment and it has not been possible to satisfactorily replace them.

The infant death-rate was 128.63 per 1,000 births, which is remarked as being almost the lowest recorded for the city.

The three principal causes of death were all respiratory diseases, ranking in the following order: Pneumonia, tuberculosis and bronchitis. In the portion of the report dealing with restaurants and foodshops, it is stated that the kitchens of many restaurants were underground and were not in satisfactory condition.

The Manchester department of health has been obliged to cope with many difficulties arising out of the war and in extenuation of the slightly increased death-rate, which was probably unavoidable, the following statement is made:

"It would have been a gratification to record a still further advance in the health of Manchester, but fluctuations must be expected to occur; the recession is not a large one, and new means will be found to effect gains in health, which is the largest element in the wealth of the community."

Wilmington, Delaware.

The report of the secretary of this board has reviewed in rather brief but very satisfactory form the various activities of the Wilmington Health Department. Important topics are given a brief summary of one or more well-written paragraphs and each such title is printed in large black-face type which makes it easy to find.

Under the heading "Deaths" the following statement is made:

"There were 1456 deaths and of this number, 57 died in our City Hospitals, who were non-residents. Deducting these from the whole number of deaths for the year, leaves a total of 1399, giving the City a death-rate of 14.88 %, which is an excellent showing and speaks well for a healthful condition; yet at the same time, the number of deaths of children under one year is entirely too large. Ninety-nine of the deaths under one year were caused by gastro-intestinal infection, nearly all of which were due to faulty feeding. Other information can be obtained from the tabulated table of deaths."

This subject of infant mortality, which is mentioned in the preceding paragraph, is given more extended treatment elsewhere in the report.

The death-rate given in this report, 14.88, is slightly in excess of that for 1913 which was 14.38.

A number of common communicable diseases are not yet reportable in Wilmington, including whooping-cough, measles, tuberculosis, chicken pox, trachoma and cerebro-spinal meningitis. These and others are on a list which the board has been urging the city council to make reportable.

Money was appropriated during the year for a very limited amount of equipment for a bacteriological laboratory and a city physician with some laboratory experience was appointed.

The Port of New York.

The JOURNAL is in receipt of the Annual Report of Health Officer of the Port of New York for the year 1914.

The office of Health Officer of the Port of New York has been long maintained as a department of the state government. It is entirely distinct from both the New York City and the New York State health departments, but is one of the most important health departments in the country. The health officer in one of his early paragraphs expresses this fact very happily when he says: "The Port of New York is the sanitary frontier of the United States. More than 70 per cent. of all the immigrants admitted to the United States annually are admitted at New York. The percentage of such immigrants whose initial inspection is at quarantine is even greater, for New York is the first American port of call of many liners that carry immigrants to the port of Philadelphia."

The report contains a graphic representation of the organization of the department and shows the following general divisions of the work; Hoffman Island, where the detention wards and the observation hospital is located; Swinburn Island, with its quarantinable disease hospital; the General Administration division in charge of financial and statistical work and the fumigation of vessels; the Laboratory; the boat service, and finally, the Marine Medical Inspection, which is, of course, the fundamental feature of the work.

Savannah, Georgia.

The 1914 Annual Report for Savannah shows that tuberculosis was the largest single factor in the death-rate, it being charged with 186 deaths. Pellagra was fifth on the list with 33. The death-rates for the past four years are given on the first page of the report. In 1911 the death-rate was 24, and in 1914 it had been reduced to 18.49. The white death-rate is not excessive. The figure for the total death-rate is due to the large colored population, among whom the death-rate from a number of diseases is very large. All but six of the 33 deaths from pellagra were colored.

The report shows that measles and whooping-cough are not reportable diseases, despite the fact that there were 17 deaths from whooping-cough.

The health officer complains that less than 80 per cent. of the births in Savannah are reported and remarks that "It is easier to trace

the pedigree of a fine horse, dog or hog in Georgia, than it is to trace the pedigree of the average citizen in that state."

The frankness with which Doctor Brunner, the Savannah health officer, says what he thinks of the legislature is refreshing. The following is an extract:

"During the year the state legislature enacted a Vital Statistics Law, hut some of the politicians were against the bill and afterwards supported it, in order that there would he no administration of the law; this is in keeping with the average legislation, touching on the protection of the public health.

"The holl weevil, ticks on a cow, or hog cholera, gets sufficient money to admit of a prosecution of the law; but, when it comes to the expenditure of money for the preservation of human lives, the appropriation of the work never goes beyond the salary of such persons, whose only qualifications are that they stand in with the political machine."

This report is a good one in itself and, moreover, it makes it clear that the department at Savannah is accomplishing results.

Cincinnati, Ohio.

Dr. J. H. Landis begins his usual excellent report with a statement regarding the city's death-rate. The total death-rate for 1914 was 15.98. An early paragraph of the report calls attention to the fact that in 1914, for the third time in five years, Cincinnati's typhoid death-rate was the lowest of 20 of the largest cities in the country, heing 5.71 per 100,000 of population.

Doctor Landis calls attention to a reduction in the death-rates for infantile diarrhœa, tuberculosis and all forms of respiratory diseases. The reduction in diarrhœal diseases is traced statistically to the filtration of the city water supply in 1907 and the introduction of efficient milk inspection in 1911. Cincinnati maintains a comprehensive system of sanitary inspection covering various places in which food is prepared and sold.

Saloon inspection revealed numerous cases where improvement was needed hut the report states that results obtained in these places were very gratifying to the department. The work of the lahoratories increased 50 per cent.

Toledo, Ohio.

The 1914 Report of the Toledo Board of Health presents a unique and very desirahle departure. On its front cover is the following useful information for the prospective reader: Population, 184,126; deaths *during year, still-births excluded,* 2,846; death-rate *per thousand population* 15.45; hirths during year, *still-births excluded,* 4.413; birth-rate *per thousand population,* 23.96.

This report contains only thirty pages but appears to cover the work done hy the department during the year in adequate fashion.

The report of the chemist and of the dairy and food inspector is included. There is a hrief summary of the work done by the bacteriologist and a tabulation of the numher and character of nuisances ahated during the year.

Among the mortality and morbidity tables the one showing the contagious diseases from 1897 to 1914 inclusive is particularly valuable. This report reveals that during 1914 there were 14 deaths in 73 cases of whooping-cough reported.

NOTES.

Important Changes in Registration of Deaths in New York City.—The 1915 edition of the Sanitary Code of the New York City Department of Health shows a number of important changes with regard to the registration of deaths. According to Section 32, the report of the attending physician must now state "the chief and determining, and the contributory, cause or causes of death." In former years nothing more specific than "cause" was demanded. The importance of a statement of joint causes in determining the true cause of death is obvious.

The physician must also state whether an autopsy has been performed, and, if so, what the findings of such autopsy have been. When death is the result of accident, suicide or homicide, the coroner's report must state how, when, and where the injuries resulting in death have been received.

The New York City Health Department is a good example of an official body which has been invested by the law with adequate authority, and which uses its powers earnestly and courageously for the common good. The health departments of other cities would do well to emulate the zeal of this organization, particularly in setting up equally high requirements for explicitness on the part of physicians and coroners in the mattter of death registration.—*L. I. D.*

*

Sanitation at Arrowrock Camp.—That excellent results are attained by our government in the application of public health principles on its construction projects, is well evidenced by the remarkably high degree of health efficiency maintained for four and a half years at the Arrowrock camp. This camp was the home of the many men employed on the construction of the huge Arrowrock Dam, twenty miles outside Boise, Idaho. Some 20,000 men had had employment there and the maximum population at one time was 1,500 people. During that time, four and a half years, not a single death from an infectious disease occurred, and there was only one case of typhoid, and that was probably brought in from the outside.

To acquire such health records, it was necessary to require rigid adherence to the laws laid down by the sanitary supervisor. At Arrowrock were applied simply the main principles of public health, that is, medical inspection before employment; medical attention; pure water supply; proper sewage disposal; cleanliness of camp buildings and grounds; garbage in airtight metal cans, and collected every two or three days, then burned; sanitary toilets, with entrances screened against flies; anti-fly campaign. Sickness in this way was held at a minimum, and there were no epidemics.

*

Weighed and Found Wanting.—In a certain district in England, namely Newcastle-on-Tyne, milk samples proved to be tuberculous or to contain an excessive proportion of organisms associated with excremental pollution. Yet the medical officer of health had been assured that this supply had passed through a pasteurization process at the city dairy before distribution. The health officer was not satisfied, so consequently tested one of the best equipped dairies.

Sample 1, original milk, as received from farm, showed B. coli present in 0.00001 cc., which was as far as the test was carried. Sample 2, after "pasteurization " at 160 degrees F., gave identical results as did sample 3 at 180 degrees. Sample 4 was "pasteurized" at 200 degrees F. and B. coli was found in quantities down to 0.0001 cc. And milk containing B. coli under 0.01 cc. is unsatisfactory!

It was discovered that the milk merely passed through the apparatus and proceeded direct to the cooler, so that the highest temperature reached was probably only maintained for a matter of moments.

It is to be hoped that if any of the health officers in this country should test the actual efficiency of the pasteurization apparatus used in dairies supplying milk within their jurisdiction, they would not be so unpleasantly disillusioned.

*

12,000,000 Gallons of Untreated Sewage per Year.—According to the October *Engineering Record*, the District of Columbia discharged the above amount of untreated sewage last year into the Potomac River. The sewer depart-

ment of the District of Columbia and the Maryland State Board of Health are attempting to coöperate on this question, both in the light of the economic value of the hundreds of tons of removable organic and other matter, and of public health.

The question of the increasing pollution of the Potomac by the District of Columbia area and adjacent Maryland towns is a serious matter, and the abatement of these conditions should be secured. Otherwise it is believed that in a comparatively short time conditions will become sufficiently serious to constitute a nuisance.

"The interests of the District of Columbia are so immediate and the conservation of the purity of these streams so important as a measure of protection to the great national parks through which they flow, that in the interest of public health and sanitation it is necessary that some adequate remedy in the form of a metropolitan sewerage district be applied."

✻

Decrease of Rabies in New York City.—During September in New York City, 1,200 negligent dog owners were summoned to court by patrolmen of the health squad for failing to comply with the dog muzzling ordinance; 832 of these paid fines.

This strict enforcement and support of this ordinance is gratifying, and the results, indicated by figures concerning dog bites and rabies, prove that the law is beneficial to the people. These results show that the number of cases of rabies found in animals examined by the health department has decreased from 64, during the second quarter of 1914, to 15 for the corresponding quarter of this year.

✻

Grand Rapids' Proposed New Charter.—Provisions adopted by the Charter Commission of Grand Rapids, at the instigation of public health and social workers, allow the establishment of a health administration founded on the principles of preventive medicine. Health comes under the Department of Public Welfare, the full-time health commissioner to be appointed by the Director of Public Welfare. His only qualification is that he shall be a man "of recognized ability in public health work." This allows for the appointment of a trained sanitarian without the requirement that he be a physician. The recommendation was made that the health officer be allowed to appoint the city physician, but this did not carry. The city physician will also be appointed by the Director of Public Welfare. Other members of the staff may be appointed by the health officer, subject to the approval of the director and to the civil service requirements of the charter. The charter allows for the creation, under the health department, of a division of vital statistics; of communicable diseases; of food and sanitary inspection; of child hygiene and of education and publicity. One of the duties removed from the health department was the collection and disposal of garbage and refuse. This will be placed under the Department of Public Service.

The charter will be submitted to the people at the spring primaries unless a special election is called.

✻

School for Midwifery at Lincoln, Neb.—In the September *Bulletin* of the Department of Public Health of Lincoln, it is stated that the Lincoln birth records have shown that a large percentage of the cases of confinement are attended by so-called midwives. Following up this discovery, it was further learned that there were nine women who made a specialty of obstetrics in that city, and moreover that there had been many instances where other women without any experience or training had superintended cases of confinement. These women were not legally entitled to do such work, yet they had been attending 16.5 per cent. of all cases of confinement in Lincoln, and to all intents would continue to do so.

The Lincoln Department of Health, realizing the fact that "the mother's care and future health is dependent on the skill exhibited by the attendants," has taken up the responsibility of bettering the confinement conditions. A school of midwifery has been organized, meeting once a month, with the purpose of giving practical instruction by way of papers read, lectures by a medical practitioner versed in obstetrics, and practical demonstrations by the visiting nurse. In addition to this, a practical treatise on this subject is being published for these women. The object of this plan is to lessen the number of midwives and to enlighten those who are actually in the field.

From now on, midwives in Lincoln must be

registered, and in order to obtain their certificate of registration they must have attended fifteen afternoons at the school, and must present fifteen different statements signed by a doctor stating that they have assisted and nursed in fifteen cases.

✻

Enameled Steel Signals in Filing Records of Contagious Diseases.—After looking over the various devices in use for the active file in a health office relating to contagious diseases, the county health officer of Los Angeles, Calif., finally hit upon a steel signal which slips over the edge of any card. These signals stand up over the edge, and can be obtained in twelve colors. By following the usual custom of the color of the quarantine sign one can identify at once the diagnosis of the case reported on the card, when placed in the file. Thus red clip, scarlet fever, green clip, diphtheria, etc. This scheme makes unnecessary the use of different colored cards. When the case is terminated, the clip is removed and card placed in permanent file. One set of signals will do for a great many cards and are not used up. They grip the card tightly, and for small card files have proved extremely useful. If a card is out of the file the clip immediately identifies it.

These clips are extremely inexpensive, and their use in the above manner is original and seemingly satisfactory.

✻

"Quack" Medicines.—In California last month a medicine labelled "Fluid Extract Serum —$25.00" was analyzed at the state laboratory and was found to contain essentially fluid extracts of sassafras, sarsaparilla, cascara sagrada, and potassium bromide. The "serum" was advertised for the treatment of diseases of the skin, kidneys, stomach, and nervous system. One poor woman purchased one of these six-ounce bottles—price $25.00—and a second one for $18.00. Naturally it did not help her any, and it practically took all the money she had. The doctor, when called upon by an inspector, had left.

The California State Board of Health *Monthly Bulletin* for September goes on to say:

"It is a crime and an outrage for any person to prey upon the public in such a manner, and it seems specially offensive when the victim is a poor woman.

"This is an offense which can be handled through the courts if the information is presented to the proper authorities. The State Board of Health will gladly investigate any cases of this character that are brought to its attention."

✻

Energetic Louisville.—The Bulletin *Health and Hygiene* for October, published by the Department of Public Health of the City of Louisville, Ky., clearly shows that this city is keenly aware of the benefits of public health work.

In a little note, it is announced that this city's fiscal year has ended, and there are published a few general results of the year's work. Louisville is justly proud of the results shown. She announces a decrease of 267 deaths from last year, a decrease of 23 from tuberculosis, of 17 from typhoid. No deaths were registered from measles or scarlet fever, and there is a decrease of more than 50 per cent. in deaths from diphtheria. Infant mortality was decidedly improved. The deaths of infants under one year of age were decreased by 93, and the deaths of infants between the age of one and two years, by 42 from last year.

It seems that this city's greatest nuisance from the public health standpoint at present is the thousands of insanitary privies throughout the city—and if these can be done away with, as the department desires, Louisville's health record will be envied throughout the country.

✻

Standardizing the Method of Handling Bottled Water.—Mr. Guy Eldredge, City Chemist of Fort Worth, sends in the following useful statement concerning the handling of Bottled Waters. "The objective of the investigation that led to the present method of handling bottled water, was the assurance to the consumers that the water in the bottles was of the same purity as the well water. This has been accomplished as near as possible, considering the personal equation.

"It was found and confirmed by bacteriological tests that the greatest source of contamination of a bottle of water after being filled at the well, was the handling of the bottle by the neck and the accumulation of dust from the streets settling on the cork and around the neck. To eliminate this contamination, a hood was devised which protects the neck of the bottle

from the time it is cleaned and filled until delivered to the consumer.

"All bottles are thoroughly cleaned, sterilized and rinsed. They are then capped with cloth hoods that have previously been sterilized and are then either placed in the wagon for filling or are stored in the bottling house. After filling, corks, that have previously been sterilized, are used and the hood replaced and kept in place with rubber bands. (Seldom found necessary.)

"In this way, after sterilizing, at no time does the hand come in contact with the neck of the bottle nor is it exposed to any appreciable dust.

"The hoods are made from a cloth much used for filtering (cotton flannel) and are efficient for the purpose for which they are intended.

"Various articles are at times found in the bottles returned to water companies and only by following some thorough and systematic method of cleaning and sterilizing can the same bottles be used repeatedly and the consumers assured they are receiving at each delivery a bottle of pure water."

✻

A City with a Protected Milk Supply.—It would seem from the following extract from the bulletin of the *Toledo* (Ohio) *Sanitary Bulletin*, that the city of Toledo should soon have an improved health administration generally. It is particularly interesting to note the big step which this city has taken in the matter of pasteurization.

The action taken in Toledo is largely the result of a report made by Surgeon Carroll Fox of the United States Public Health Service, upon the health conditions of his city. A number of his recommendations are embodied in the reorganized system.

"Pasteurization of all market milk has been provided for, to take effect December 1, 1915. Seven nurses have been appointed to take care of communicable disease work. The sanitary police force has been reduced from seventeen members to five. We are now furnishing disinfectants in cases of typhoid fever. Administer antityphoid vaccine to those applying for it. We also furnish the vaccine gratis to physicians for use in their practice. Cultures are taken from all contacts in diphtheria cases. Automobiles are now being used by the dairy farm inspectors, three of them having been purchased. The records are now being kept so that the cost of any branch of department work can be told at a glance.

"A thorough study of the milk supply is now being made, as recommended, and better milk will surely result. It was recommended that all surface wells in the city be eliminated; this is being done as fast as examination can be made, it having been ruled that in this way only could the well be ordered closed. The work of assembling all laws and regulations referring to health work is now under way; when compiled they will be printed in pamphlet form for use of the employees.

"The creation of a department of health, under the new charter, instead of the health department being a division under the department of welfare; placing the health officer on full-time; coöperation of police force in suppression of nuisances; placing isolation hospital under control of health department; the extension of sewers and water mains to all parts of city; combining the work of the Thalian Society with the health department; more frequent collections of garbage and rubbish; the appropriation of $75,000.00 for health department work are all matters beyond our control but efforts will be made to have the proper parties put them in effect."

✻

A New Registration Law.—The *Survey* of August 14 calls attention to the following legislation enacted this year in Oregon:

"The law requiring registration of births and deaths was revised and made possible of enforcement throughout the state. A local registration bureau, the officers of which are responsible to the state board of health, is provided for in every incorporated town of 2,000 population or more. Each bureau has jurisdiction over certain districts, which include settlements not incorporated."

✻

Typhoid as a Means of Suicide.—A recent bulletin issued by the North Carolina State Health Department quotes a man living in North Carolina who believes that it is almost equal to suicide for anyone to die of typhoid, when the inoculation, which is being so widely practised in that section, is made so easily available. This gentleman is quite incensed to note that, although the inoculation is being offered free in his city less than half of the people

have accepted it. He says that, while he does not really believe a man who gets typhoid through neglect to take the inoculation which is offered to him, has deliberately chosen to die rather than to live, he does think that such a man is largely responsible for his own death if it comes as a result of typhoid.

If half or nearly half of the people in this man's community have been inoculated against typhoid he should not despair but rejoice that a great miracle has been wrought. The treatment of any large proportion of the population of any community with a prophylactic treatment which is a new, or comparatively new procedure, should be regarded not as a small result indicative of a discouraging outlook, but as a glorious indication of the better day that is coming in the world of things which make for public health.



Work of Rockefeller Sanitary Commission in North Carolina.—The following resolution of the North Carolina State Board of Health briefly summarizes the work done in that state during the past five years by the Rockefeller Sanitary Commission:

"*The Official Thanks of the North Carolina State Board of Health for the Assistance of the Rockefeller Sanitary Commission.*

"Whereas, the five-year period for which the foundation for the eradication of hookworm disease was established has expired; and

"Whereas, the work of the Rockefeller Sanitary Commission terminated in North Carolina, May 1, 1915; and

"Whereas, the Rockefeller Sanitary Commission has expended the sum of $81,516.23 during the last five years in improving sanitary conditions in North Carolina; and

"Whereas, the work of the Commission has resulted directly in the examination of 267,999 citizens of this state for hookworm infection, in furnishing treatment to 95,618 infected citizens, in improving 1,796 privies and, indirectly, in an extensive development of an intelligent appreciation for public health work along all lines of sanitation; therefore be it

"*Resolved*, That the North Carolina State Board of Health do hereby officially record their appreciation of the work in this state during the last five years of the Rockefeller Sanitary Commission; and be it

"*Further Resolved*, That a copy of these resolutions be sent to the successors of the Rockefeller Sanitary Commission, to wit, the International Health Commission, and that these resolutions be given public notice through the Bulletin of the North Carolina State Board of Health."

This resolution, which was printed on the cover of the *Health Bulletin* for July, constitutes a dignified and well-chosen means of publicly expressing the appreciation of the work of the commission, which the health authorities and the people of North Carolina must feel.



Score Cards for Eating Places.—The Bulletin of the Health Department of Asheville, N. C., contains the "Scores" of about thirty restaurants. Both equipment and methods are taken into consideration and then the final score is determined. These scores run as high as 98 and as low as 50.

The points allowed on the score card are as follows:

EQUIPMENT

Construction 10—Floors and drainage 7, walls 2, ceilings 1.

Arrangement 7—Proper rooms, 4 convenience 3, light 5, ventilation 5, screens 5, cellar 3.

Plumbing 20—Kind, quality, location and condition—water closets 10, sinks 10.

Equipment 25—Kind, quality, arrangement—ice boxes 15, tables 5, utensils 5.

Water for Cleaning 20—hot 15, cold 5—total 100.

METHODS

Cleanliness 20—Floors 5, walls 3, ceilings 1, doors 1, windows 1, good order 1, free from odor 2, freedom from flies 6.

Equipment (*Cleanliness*) 30—Ice boxes 10, tables 5, sinks 5, utensils 10, employees' cleanliness 5.

Foods 30—Conditions 10, storage 10, handling 5, cleanliness 5.

Garbage Receptacles 15—Adequate 5, location 5, condition 5—Total 100.

Score for Equipment . . . ; multiplied by 1
Score for Methods ; multiplied by 2
Total to be divided by 3
Final Score

Remarks. (To cover such unusual conditions as sleeping accommodations, or the presence of domestic animals in or about work room, etc.)
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Manufacturer of Disinfectants Makes Misleading Statements.—The bulletin of the New York City Health Department, November 6, makes the following statement in regard to the unreliable claims of disinfectant manufacturers:

Without detracting from the value of disinfectants when properly used, health officials have come to learn that much of the so-called room disinfection heretofore practised during and after infectious disease was unnecessary and are placing their main reliance on mechanical cleansing with soap and water, followed, if possible, by sunlight and fresh air.

The manufacturers of disinfectants, on the other hand, continue to allege the advantages of their various preparations, and in support of their position often make alarming and misleading statements concerning the mode of spread of infectious diseases. Thus the suggestion was recently made that "during the course of such diseases as typhoid fever the germ can be recovered without difficulty from horizontal surfaces near the bedside," and that on account of this circumstance "the Department of Health should require the periodic cleansing with antiseptic fluids of the furniture and floor about the bed."

In order to test the validity of this statement and the need for the suggested action, the Bacteriological Division of Mt. Sinai Hospital recently undertook a careful investigation, during the course of which more than forty cultures were made. The results were uniformly negative so far as the presence of a motile bacillus or any bacillus resembling the bacillus of typhoid fever was concerned. Staphylococcus was recovered in some instances, and in others contaminated cultures were obtained; but in no instance as already stated, was there any evidence of the presence of typhoid bacilli.

✻

Pollution of Streams by Municipal Sewage. Damages Awarded against a City because of the Pollution of a Stream by Its Wastes.—The city of Henderson, Ky., discharged its sewage into a small stream called Canoe Creek. The slop from a distillery, which was for some time discharged with the city sewage, settled to the bottom of the creek and decomposed, killing the fish, making the water unfit for drinking by stock, and creating a stench. Owners of property along the bank of the stream brought suit against the city and the operator of the distillery for damages to their property.

The Court of Appeals of Kentucky decided that the city was liable, but relieved the operator of the distillery, holding that, as the city had permitted the distillery to connect with the city sewers and had made no attempt to regulate the character of matter discharged from the distillery into the sewers, the city was responsible for the damage done.

The essential part of the opinion is published in the Public Health Reports at page 3303.

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Alcohol, Syphilis, and Gonorrhea, on Death Certificates.—The following is an important suggestion from the *Bulletin of the American Social Hygiene Association:*

A recent bulletin of the Department of Health of New York City says: "The Department of Health has long since felt the need of more accurate statistics of the influence of alcohol on mortality and has realized that numerous deaths wherein alcohol, if not the primary cause, at least played an important rôle, have been recorded without reference being made to this important etiological factor. This, of course, is true also of deaths in which gonorrhea or syphilis has played a part. We appreciate the numerous and weighty reasons that induce physicians, if not to hide, at least to withhold this information. On the other hand, we should be shirking our duty as health officers if we did not make serious attempts to secure this information in order that it may be made the scientific basis of a campaign against these grave menaces to public health.

"In order to secure some degree of correctness in the statistics bearing upon the influence of alcohol on the death rate, the Bureau of Records has long been directing confidential letters of inquiry to physicians who report deaths in which it is apparent from the cause specified that alcohol or venereal infection has been a factor in terminating life. This method, while it has been helpful, has not proven sufficiently effective, and the department, therefore, appeals to physicians through the *Bulletin* and asks that in every case where these factors have been a contributing cause of death, they state that fact upon the certificate. Any objection to this procedure may be met by the employment of medical terminology, such as Ethylism Neuritis

(Ethylie), Ethylie Hepatitis, Salpingitis (probably Neisserian), Hepatitis (probably Spirochætal).

"Still another plan is to send a brief note sealed with the certificate. This information thus obtained will be treated in the strictest confidence and the note immediately destroyed. We urge upon the physicians the broader duty which they owe the community not to allow their sense of obligation to patients to stand in the way of supplying the Department of Health with this most important information."

Public Health Notes.

Cancer Mortality.—F. V. Beitler, Baltimore (*Journal A. M. A.*, October 16, 1915), discusses the mortality statistics of cancer as given by the census bureau. He says while the figures which he has used are, within the limit of slight error, correct, such questions as the relation of unimproved methods of diagnosis to the cancer mortality or the relation of changes in the composition of the population to the same must be given careful consideration in the final analysis of any cancer statistics. His survey of the cancer mortality covers the ten years from 1904 to 1913 in the registration area. A steady increase is noted in his table in all years except 1906. During these ten years the reported deaths from this cause increased from 23,395 in 1904 to 49,928 in 1913, and from a mortality of 70.15 per 100,000 in 1904 to 78.88 in 1913. In the year 1904, cancer deaths in males constituted 1.61 per cent. of the total mortality; in the year 1913, 2.25 per cent. In the female population for the year 1904, the cancer mortality was 2.63 per cent. of the total, and in the year 1913, 3.35 per cent. With regard to age distribution, he gives tables constructed from the registration states for the decennium between 1900 and 1910. Referring to these tables it is seen that in the year 1900, 10 per cent. of the cancer mortality occurred prior to the fortieth year of life, and in the year 1910, about 9 per cent. After the fortieth year the deaths per 100,000 show an increase in the year 1910 over all rates in the year 1900; furthermore, the increases are progressive, that is, the greater the age period the greater the relative and absolute increase. The greatest increase in mortality rates is seen in the charts in the age period from 80 to 90 years, which was 587.44 per 100,000 of the population in 1900 and 811.87 per 100,000 in 1910. With regard to the location of the cancer in the body, the most frequent sites as shown by the mortality are the stomach and liver. The next in frequency is cancer of the female genital organs. Cancer in the intestines is followed closely by cancer of the breast in order of frequency. The figures altogether lead to one conclusion: cancer mortality is increasing. Undoubtedly new methods of diagnosis have greatly facilitated the detection of cancer, especially in the incipient stage. The diagnosis of advanced cancer is in most cases much simpler. There is very little change in the relative sex mortality. Any change which would add to the population over 40 years of age would increase the cancer mortality, but Beitler's statistics taken from the census reports do not show much difference in the proportions of the population in the different years. He says: "If we cannot account for the increase in the cancer mortality by better diagnosis or by changes in the composition of the population, I submit that for the past decade the cancer rates in the registration area show a true increase."

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Expensive Failure to Register Birth.—The failure to register the birth of a child often creates amusing circumstances, and this was well illustrated last month at the Virginia State Fair when, in the "Better Baby Contest," a 99 per cent. child, judged 1½ per cent. higher than any other child shown, could not receive the gold medal.

The child's birth had not been registered in accordance with the law. Strange to say, the child's father is a physician.

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Vacation Typhoid.—After the summer vacation period is over it is only natural that a number of articles should appear on vacation

disease. The causes for the greater opportunities of infection, and the danger of inferior and inadequate sanitary facilities which prevail in many temporary or seasonal resorts are well known.

An interesting article on this subject has appeared in the August *Monthly Bulletin* of the Indiana State Board of Health. It mentions the primitive sanitary accommodations of many of the simpler resorts, the lack or at least the inadequacy of sanitary supervision, the varied type of hotel help, the carelessness and ignorance of the dairy and ice-cream dealers, who cannot afford the expense of a safe product.

It is clear that under the above conditions, well-to-do people, who, at home, insist on safe water and pasteurized milk, become extremely susceptible to infection.

Finally the *Bulletin* suggests three ways by which the problem of the insanitary summer resort may be met:

"1. Persons who have not had typhoid should be vaccinated before going.

"2. Every person before going to any summer resort should find out either from the proprietor of the hotel or the State Board of Health just what the sanitary conditions are.

"3. Every person conducting a summer hotel or boarding house should obtain a license of the State Board of Health, the fee for which should be large enough to cover the cost of a thorough sanitary survey of that hotel or boarding house."

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The Schick Test.—Two years ago Schick, of Vienna, described the skin test for the presence of diphtheria antitoxin in the blood. Quoting the New York City's Health Department *Bulletin* for October 16:

"The application of the Schick test will serve as a reliable clinical help in selecting the individuals who need prophylactic injections of antitoxin, after they have been exposed to diphtheria. In the homes among the relatives of patients suffering from diphtheria, in schools and orphan asylums after an outbreak of the disease and as a routine procedure on patients, nurses, and resident staff in general and contagious disease hospitals, the use of the Schick test not only results in a great saving of antitoxin, but also avoids unnecessarily sensitizing more than one half of the exposed individuals."

A positive reaction is sufficient to indicate less than 1-30 of a unit of antitoxin in 1 cc. of blood serum, which shows that the individual tested is susceptible to diphtheria.

The *Bulletin* continues:

"The great difficulty in popularizing the test and placing it within the reach of the general practitioner has been, on the one hand, the inconvenience of handling the undiluted toxin, and, on the other hand, the rapidity with which the diluted toxin deteriorates on keeping, whether in solution or in tablet form. An outfit has been devised to furnish a standard amount of undiluted diphtheria toxin, which remains of fairly constant strength when kept in the ice box, and can be readily diluted when required. The outfit is supplied to physicians in New York City by the Bureau of Laboratories of the Department of Health. We have every reason to believe that it will be found convenient and reliable."

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London's Opinion of Inoculation in United States.—"In the United States of America, where the risks of typhoid infection are considerably greater than in this country, there has recently been an enormous increase in the number of persons voluntarily seeking inoculation. Not alone is this increase manifested among government and municipal employees, but the general public is also awakening to the value of this protection. Reports from general practitioners indicate that many of the people are receiving the preventive treatment, and laboratory establishments have had a greatly increased demand for the vaccine. So great is the call among employees of the government that it has been necessary to issue a second edition of the secretary of the treasury's circular, stating the localities where the treatment may be received. It is estimated that during 1914 over 100,000 persons throughout the country were immunised, and it is believed that in 1915 the number will exceed 300,000. The United States Public Health Service is confident that more widespread recognition of the benefits conferred by anti-typhoid immunisation will have an immediate effect upon the morbidity and mortality rates for the disease. As a result of sanitary measures alone, the death-rate from typhoid has been cut in half during the last fifteen years; it is expected that what has been done in fifteen

years of sanitation can be accomplished in as many weeks with inoculation. Dr. J. Dill Roberston, health commissioner for Chicago, in a recent issue of his monthly bulletin, claims that if immunisation attains the general recognition that smallpox prevention has secured, typhoid will be a rare disease by 1930. This means, he says, that even many of the older physicians of today will live to see the time when the infection will no longer be common, though the entire elimination of the disease is not to be looked for until universal immunisation is practiced. To this end Dr. Robertson urges that the general public must be taught the value of the remedy and the need of it."—*The Medical Officer*, London, October 16, 1915.

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Carbon Bisulphide as Insecticide and Germicide.—"According to an article appearing in the *Wiener Klinische Wochenschrift*, April 15, 1915, carbon bisulphide has been found to meet all the requirements of a louse-destroying agent. It is prepared by passing sulphur fumes over red hot coal. When fresh it has a disagreeable odor which it loses on distillation. A large tin can is three-fourths filled with carbon bisulphide and 150 grams of paprika and 250 grams of flores sulphuris are added for every kilogram of carbon bisulphide. The clothes are hung up and the mixture is placed in tin trays and lighted. At the end of two hours, the lice as well as the eggs are destroyed. The residue remaining in the tin trays may be used as a deodorizing agent. The results obtained with carbon bisulphide as a remedy against lice have been so satisfactory that it was thought to be of value as a bactericide. Pieces of cloth soaked in bouillon cultures of typhoid and cholera and later allowed to dry were exposed to the fumes and after two hours the bacteriological examination was negative. Pieces of cloth impregnated with bouillon cultures of the same organisms and placed in Petri dishes were exposed for the same length of time and the examination was again negative. Fresh virulent cultures of the organisms, in both open and closed reagent bottle, were likewise exposed and with a single exception (one tube of cholera bacilli) the subsequent examination was negative. Slant agar cultures were also killed in the same length of time. From these investigations it would appear that this agent acts not only against lice but also against pathogenic bacteria which may be present in clothes."—*The Medical Officer*, London, October 23.

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Complement Fixation in Pertussis.—"The most reliable antigen for complement fixation tests in whooping cough was obtained by Olmstead and Luttinger, by autolyzing an aqueous emulsion of a twenty-four to forty-eight-hour growth of the Bordet-Gengou bacillus for from eighteen to twenty-four hours at 56 C. and shaking for several hours. The closeness of relationship of the Bordet-Gengou strains is still under investigation. To obtain the maximum number of positive reactions it may be necessary to use a polyvalent antigen. Active serum may give nonspecific positive reactions. A negative reaction given by active serum is stronger evidence of the lack of an infection than is a negative reaction given by inactive serum. For fixation one-half hour in the water bath or one hour in the incubator is absolutely reliable. Icebox fixation probably gives reliable results; the optimum period is still to be determined. Fixation at room temperature for four hours is unsatisfactory, at least in rooms with variable temperature. About 40 per cent. of whooping-cough cases have given a positive reaction with antigens of the Bordet-Gengou bacillus, when inactive serum was used. The highest percentage of positives is given by convalescent vaccinated cases. Ten per cent. of whooping cough cases have given a positive reaction with antigens of hemoglobinophilic strains. A $+ +$, $+ + +$, or $+ + + +$ reaction by inactive serum with an antigen of the Bordet-Gengou bacillus is diagnostic of whooping cough, a $+$ or $\pm$ reaction is suspicious, a negative reaction has little significance. Complement fixation tests on serum from 111 cases of pertussis or suspected pertussis support the theory that the Bordet-Gengou bacillus is the etiologic factor in the disease."—*Journal American Medical Association*, from Archives on Int. Medicine, July, 1915.

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Marriage and Tuberculosis.—The following is the head-note of a New York Supreme Court decision holding that a wife is entitled to a decree annulling her marriage to a man who at the time concealed from her the fact that he was suffering from tuberculosis:

"It is proper for a court, in view of the widespread prevalence of tubercuIosis and the disas-

trous consequences to those who suffer from it, to take judicial notice of its infectious character and the fact that close association with a person afflicted with that disease, unless attended with great care, occasions danger of infection to those coming into close contact with such person.

"The fraudulent concealment of material facts concerning the condition of his health by one party to a marriage contract justifies the legal annulment of the marriage at the instance of the other party.

"The defendant knew before the marriage that he was suffering from tuberculosis. He concealed this fact from the plaintiff, and represented that certain symptoms of the disease were the result of a cold. Upon discovery of the facts the plaintiff ceased to cohabit with him. No offspring resulted from the marriage. The court annulled the marriage on the ground of fraudulent concealment and misrepresentation. *Sobol v. Sobol*, 150 N. Y. Sup., 248.—New York City *Bulletin*, October.

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The Problem of Rural Health Administration.—The following is an abstract from an editorial published in *The Journal of the American Medical Association* for October 16, 1915:

"The problem of securing efficient administration of public health laws is especially difficult in the rural districts. City and town can today obtain the best health service for which they are prepared to pay. The small community, on the other hand, unless the circumstances are exceptional, cannot command the various kinds of expert knowledge, medical and sanitary, chemical, bacteriologic, engineering and statistical, which are essential for the adequate handling of its problems.

"Attempts along several different lines have been made to meet this need. In many Southern states, health officers are provided for on the basis of county units. In Massachusetts an interesting plan of voluntary community coöperation has been worked out under the guidance of the public health faculty of the Massachusetts Institute of Technology. The most promising plan of all is perhaps the organization of a corps of state sanitary supervisors, acting under the direction of the State Board of Health and bringing to the support of the local health officer the technical knowledge and the moral support of the entire state.

"This system has been in force in Massachusetts, in one form or another, for nearly ten years. It has been incorporated in the new public health law of Maryland, and two years ago was made part of the model health law of New York State.

"Those who have followed the development of state health organization in this country noted with satisfaction how the attacks made by the legislature on the New York health law last spring were in the main brought to naught by the remarkable support which that law received from the press and the people of the state. What the politicians dared not do openly they attempted, however, to effect by the familiar method of indirection. It appears that while the plan to cut down the number of state sanitary supervisors in New York from twenty to ten was abandoned, the appropriations made allow only for ten of these important functionaries. If the next legislature does not make special provision for this need, the work of the New York state department will be seriously crippled."

"It is gratifying," says *The Journal of the American Medical Association*, "to observe that Governor Whitman, in his address of welcome to the American Public Health Association at Rochester, on September 7, placed himself fairly on record against such petty politics."

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An Inspection Clinic.—Sir George Newman, chief medical officer of the Department of Education of London, thus tersely describes the function of the inspection clinic:

1. The further and fuller examination of children referred as a result of medical inspection in the school.

2. The examination of children referred in regard to fitness to attend school, or to undertake physical exercises, swimming, school journeys, etc.

3. The examination of candidates for admission to special schools—schools for the deaf, blind, mentally and physically defective, open-air schools, etc.

4. The supervision of children suffering from such conditions as uncleanliness and ringworm.

5. The periodical supervision of all cases of phthisis.

6. The inspection of children who have suf-

fered from infectious and contagious diseases, and of "contacts" prior to their return to school.

A Treatment Clinic.

Treatment clinics should have facilities for the treatment of all afflictions of school children which require no operative or bed treatment. Considered generally there should be:

1. A General Medical Service: To treat minor ailments, cases of accident and emergency cases. Here treatment and instruction in cleaning the head, eyes, ears, mouth, etc., might be given.

2. Ophthalmic Division: Errors of refraction. Diseases of the eye.

3. Orthopædic Department: To correct and treat orthopædic defects (non-operative).

4. The operative department for nose and throat work should be located, if possible, adjacent to the school.

5. Dental Clinic.

Socializing Health.

Assuredly this is a step in the direction of ultimately socializing the doctor and the dentist, just as education is socialized. No one will complain that the private preserve of profit of the educator has been invaded. It has been enlarged and in an organized way is doing a work which no private enterprise could parallel. It will be a great step forward when the state will employ the medical and dental professions to prevent disease instead of subsisting on its cure.

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Mobile Laboratories with the Army in France.—"The introduction into field operations of mobile laboratories is one of the outstanding features of the medical arrangements of the British Expeditionary Force. In the early stage of the war there were only one or two of them, but now there is quite a fleet. Each can do its work, if necessary, even in a neighborhood where buildings are entirely lacking. The common aim of the laboratories is to provide any additional scientific data which may from time to time be required when the general principles of preventive medicine are being applied at the real front. They therefore seek to lessen the wastage due to contagion, air-borne, food-borne, or water-borne disease. The work done includes the testing of urine of every man of a whole division who was known or suspected to have previously suffered from enteric fever, with a view to the discovery and removal of carriers; the diagnosis of cerebrospinal meningitis and the watching of contacts and supervising bacteriologically the treatment of acute cases of this disease by various specifics. Some very useful work has been done in dealing with the typhoid fever epidemic among the Flemish; in addition to all actual cases being brought under treatment, and the homes of the patients put into proper sanitary condition, over 20,000 people applied for antityphoid inoculation and about 80 per cent. of these returned for the desirable second dose. The whole business of dealing with zymotic disease has been excellent; the zymotic morbidity curve, and especially the typhoid curve, has been, so far, kept down to a satisfactory low level which, considering the number of men, is noteworthy."—*The Journal of State Medicine*, London.

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The Prevention of Pellagra.—In the October 22d Public Health Report of the U. S. Public Health Service, there is published a long careful report on the above subject. The investigation was carried out by Joseph Goldberger, surgeon; C. H. Waring, assistant surgeon; and Daniel J. Willets, assistant epidemiologist, U. S. P. H. S. The results reached were deduced from a test of the diet among certain institutional inmates. Below are set down certain portions of the report describing the cause for this investigation, its purpose and the general conclusions.

"In a paper published June 26, 1914, attention was called to certain epidemiological observations relating to pellagra which appeared inexplicable on any theory of communicability. These observations showed that, at certain institutions at which pellagra was either epidemic or had long been endemic among the inmates, the nurses and attendants, drawn from the class economically and socially identical with that most afflicted in the population at large, appeared uniformly to be immune, although living in the same environment and under the same conditions as did the inmates. Neither 'contact' nor insect transmission seems capable of explaining such a phenomenon. It was suggested that the explanation was to be found in a difference, which was believed to exist, in the diet of the two groups of residents.

"From a study of the dietaries of certain institutions in which pellagra prevailed, the impres-

sion has been gained that cereals and vegetables formed a much greater proportion in them than they did in the dietaries of well-to-do people; that is, people who as a class are practically exempt from pellagra. It was suggested, therefore, that it might be well to attempt to prevent the disease by reducing the cereals, vegetables, and canned foods and increasing the fresh animal foods, such as fresh meats, eggs, and milk; in other words, by providing those subject to pellagra with a diet such as that enjoyed by well-to-do people, who as a group are practically free from the disease."

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"All that they wish to say at present is that the dietary 'fault' upon which in their judgment the development of pellagra essentially depends is capable of being corrected or prevented by including in the diet a suitable proportion of these foods. Nor are they to be understood as meaning that the pellagra-causing 'fault' is capable of correction or prevention in this way only. The possibility is not excluded that there may be other foods capable of serving the same purpose. Indeed, there is some reason to justify at least a suspicion that barley, rye, and millet may have this power in some degree.

"Moreover, it may be, if Funk's suggestion that pellagra is a vitamine deficiency, brought about by the consumption of overmilled corn, is proven to be correct, that the use of undermilled corn will of itself correct the 'fault' in a diet in which this cereal is the staple. For the present at least the point of chief, of fundamental, practical importance is the recognition of the fact that the pellagra-producing dietary 'fault,' whatever its essential nature or however brought about, is capable of correction or prevention, as the results presented seem to clearly indicate, by including in the diet suitable proportions of the fresh animal and leguminous foods."

Summary and Conclusion.

"1. The diet at two orphanages, 'M. J.' and 'B. J.' for several years endemic foci of pellagra, was modified in accordance with the directions of the writers in September, 1914. Hygienic and sanitary conditions have remained unchanged.

"2. The modification in the diet consisted principally of a marked increase in the fresh animal and the leguminous protein foods.

"5. At the Georgia State Sanitarium, an epidemic focus of pellagra, a ward of pellagrins in the colored female service and one in the white female service was organized for a test of diet in the prevention of pellagra.

"The diet in these wards was modified on the same principle as that at the orphanages. The institutional routine and the hygienic and sanitary conditions have remained unchanged.

"7. Since the change of diet, there has not been observed this year any recognizable evidence of a recurrence in any of the pellagrins in these wards, 72 of whom (36 colored and 36 white females) have remained continuously under observation throughout this period.

"8. During the corresponding period of observation, not less than 15 (47 per cent.) of 32 control female pellagrins have presented recurrences.

"9. The conclusion is drawn that pellagra may be prevented by an appropriate diet without any alteration in the environment, hygienic or sanitary."

Recently (Nov. 12) the U. S. Public Health Bulletin published the results of further investigations by Goldberger. The possibility of producing pellagra in the healthy human white adult male by a strictly one-sided mainly carbohydrate (cereal) diet was tested. It took place at the farm of the Mississippi State Penitentiary.

Of the volunteer squad, eleven men, between the ages of 24 and 50, remained on the test from February 4 until October 31, 1915. The men were carefully watched to be sure of no evidences of pellagra before the food test commenced. Controls were kept, work was as usual, sanitary conditions were the same. Six of the squad developed symptoms justifying a diagnosis of pellagra. No others in the camp showed any signs of the disease.

Conclusion: The conclusion is drawn that pellagra has been caused in at least six of the eleven volunteers as a result of the restricted diet on which they subsisted.

Industrial Hygiene and Sanitation.

How to Start a Safety Campaign.—*Safety Engineering* is the source of this interesting note:

The following suggestions are addressed to the factory manager who has become convinced that safety is an indispensable part of an efficient factory organization, and wants to organize his plant so as to secure the coöperation of his foremen and workmen in preventing accidents.

1. Call your superintendents and foremen together and tell them plainly what you have in mind. Lay before them the experience of other companies in reducing accidents and outline the methods adopted. Ask the National Safety Council for details. Agree on a definite program and make a written outline of the items in the order in which they are to be taken up; the more serious points of danger, of course, should be covered first.

2. Remember the company must show by visible and tangible signs that it means business and will do its part, before it can go to the workmen and ask them to coöperate; therefore the first thing to do is to build safeguards and cover the more serious points of danger.

3. Some one person should be selected to give a part or all of his time, depending on the size of the plant, to the work of looking after the details of safety. He should be known as the safety inspector.

4. During the first six months have frequent meetings of the superintendents and foremen for the purpose of reporting progress, exchanging suggestions and fostering interest and enthusiasm.

5. After considerable guard building has been done, and you have succeeded in getting your superintendents and foremen lined up and interested, then call a meeting of all of your employees. The manager should preside at this meeting and should lay before the men the facts as to the causes of accidents, the large percentage of which cannot be prevented by guards, and the part which the workmen must do. He should frankly state that in the past the company has been negligent and accidents have happened which might have been prevented had proper guards been provided. He should also state with equal frankness that many men have been injured because they were careless and thoughtless. He should say that now a new leaf is to be turned over and the company will go to the limit and will build any guard which is practical, and urge the men to coöperate and all pull together for a safe shop. The superintendent and some of the foremen should also speak at this meeting. If it is possible, have your doctor speak on first aid and the importance of reporting slight injuries.

6. At this meeting appoint a workmen's inspection committee and outline its duties. Make it plain that the members of this committee are to have absolute liberty to make any inspection they wish, and to offer as many suggestions as possible—the more the better. Urge every employee to report suggestions to the committee.

7. Select a safety motto for the shop, such as:

"No accidents."
"Stop Accidents."
"A Safe Shop."
"Boost for Safety."
"Safety First."

8. Place bulletin boards in each department and post on them such materials as the following:

The motto of the shop in large letters.

Pictures of injured men with stories of the accidents.

Newspaper clippings of accidents.

Copy of suggestions made by workmen's committee.

Analysis of accidents showing causes.

Monthly report of accident records in the various departments.

National Safety Council bulletins.

9. Remember that the secret of a successful safety campaign is to grip the proposition just as you would a new piece of work in the manufacturing end of your business. Convince every foreman that the company is determined to eliminate accidents, and give them to understand that they are expected to do their part. Be absolutely frank with your workmen and make them feel that you are going to recognize them; give them a large part in the work, and let them know that you will welcome any suggestions.

A safety campaign should start off with vim;

the men should be made to feel that a new leaf has been turned over and everybody is to take a new start; a sort of "all pull together" spirit should be fostered. An enthusiastic start will do more to jar the men loose and awaken interest than months of humdrum plodding effort. One manager who reduced accidents 50 per cent. the first year was asked how he did it. He replied, "I made a noise, and I kept right on making a noise until every man in the shop got to thinking about safety."

Note.—Other activities which will be helpful.

Start a safety campaign in the schools. The children will carry the message home and help to increase the interest of the parents.

Ask the ministers to conduct a safety Sunday.

Secure publicity in the local papers.

Have moving picture films run in the local theaters showing such films as "The Crime of Carelessness," etc. Write National Safety Council headquarters for list of available films.

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The Rubber Industry.—We are in receipt of a Report of the U. S. Department of Labor on "Industrial Poisons Used in the Rubber Industry" investigated by Dr. Alice Hamilton. The report is some sixty pages in length with fourteen good illustrations of the various important processes of this industry.

The number, location, and products of the plants studied are first discussed, followed by the processes which may be dangerous to the worker, such as vulcanization and rubber cement making.

The general conditions in the rubber industry are reviewed in the next section, among which are described—carelessness in handling industrial poisons; facilities for washing, etc.; employment of women and girls; hours of labor; with the following summary:

"In the main, conditions as to light, ventilation, and physical surroundings in the rubber factories visited are excellent. In the newer plants, especially, there was an evident intention to make the workplaces not only sanitary, but comfortable.

"The processes of rubber manufacturing involve the use of several poisonous substances, of which lead salts, antimony pentasulphide, aniline oil, carbon disulphide, and carbon tetrachloride are the most dangerous. The operations involving exposure of these poisons employ but a small proportion of the workers. No women and very few boys are engaged in such operations. A lesser danger is found in the use of coal-tar benzol and of various petroleum products such as naphtha, benzine, etc. A considerable number of the workers, including women and boys, are exposed to the fumes of these compounds."

The poisons in this industry are lead, antimony, aniline oil, coal-tar products, petroleum products, carbon disulphide, carbon tetrachloride, phenol and other organic compounds. The conditions under which these poisons are used and their general effects, real and possible, are well explained.

There follows a lengthy description of the processes themselves, ten in number, which make up the industry, such as compounding, mixing, buffing and grinding, etc. The general conditions under which these several processes are carried out is well presented, the danger which exists for the employee, also how, in many instances, objectionable conditions may be and have been overcome.

The report is very fair and unprejudiced, and it seems that, though this industry has many possibilities for being unhygienic and dangerous to the health of the worker, in most cases, investigation shows that the great majority of rubber workers suffer no really bad effects from their work. However, the report clearly points out that this industry in America is still unnecessarily unhealthful.

Following is the general summary of the investigation:

"The industry is not, in this country, considered a dangerous one, for relatively few of the workers are exposed to a harmful extent to the poisonous dusts and vapors of these substances. A small number of employees who sift and weigh the lead salts and mix them with rubber run the risk of lead poisoning. An even smaller number of men engaged in compounding rubber and in reclaiming rubber scrap are exposed to the fumes of aniline oil. A few men handle the golden sulphide of antimony, which is used largely in compounding, and a few others use benzol as an ingredient of cement. Among those exposed to these poisons the rubber compounds and mixers show a high rate of lead poisoning. Aniline poisoning is far less frequent than formerly but still occurs.

"A larger number of workers, including many

women, are exposed to the fumes of petroleum, naphtha, and benzine in cementing rubber articles, but these fumes are seldom heavy. In making cement and in making spread and dipped goods heavier fumes of these compounds are produced, but only a few workers, all men, are engaged in these processes. Acute, severe benzine poisoning is rare, but chronic, mild benzine poisoning is probably very common.

"A few men engaged in vapor curing use carbon disulphide in the form of vapor, a few others engaged in dipping use the liquid form, and a much larger number use it for painting the ends of inner tubes. Among the dippers carbon-disulphide poisoning is fairly common; it is less frequent, but still occurs, among those who use the disulphide as a paint or in the form of vapor. In a few factories carbon tetrachloride is used as a substitute for carbon disulphide; it is dangerous but less so than the carbon disulphide.

"There need be little if any trouble from these poisons if proper precautions are taken by the employers. All that is required for the workmen's protection is the prevention of dust and fumes by means of closed receptacles and strong air exhausts, and the provision of washing facilities and clean lunch rooms.

"American rubber factories, even those that are in other respects admirably constructed and managed, are, almost without exception, lacking in the proper protection of workmen against poisons. In consequence the industry is much more unhealthful in this country than it need be."

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Wage-Earners and Sickness.—The *Journal of the American Medical Association* says, in reviewing the Final Report of the Commission on Industrial Relations, that while a great deal of time and attention is devoted to accident prevention, accidents cause only one seventh as much destitution as does sickness. Each of the thirty odd million wage-earners in the United States loses an average of nine days throughout the year, at an average cost of two dollars a day. Thus the wage loss from this source is over $5,000,000 while the additional cost of medical treatment, of at least $180,000,000, increases the total sick bill of these wage-earners to $680,000,000 a year. Thirty to forty per cent. of cases requiring charitable relief are due to sickness resulting from poverty, causing insufficient diet, bad housing, inadequate clothing, and unfavorable home surroundings. According to this commission's report, surroundings and place of work and personal habits of the worker are important but secondary facts. This means that, although the investigation and care of the wage-earner while at his employment should not be allowed to diminish in intensity, more relief and bettering conditions at his home must be seen to. The commission submits that the present condition can be satisfactorily corrected only when wages are sufficient to enable the worker to maintain a proper standard of living and to meet the expense of proper medical attendance when necessary. As a present solution the commission recommends a form of sickness insurance to be administered by the government, the fund for this insurance to be contributed by the employer, the employees and the government.

✻

Pay Attention to the Poor Man!—"There can be no real national improvement unless the masses of the people secure higher wages, more reasonable working hours and better conditions of work. Put in words these purposes seem commonplace and even materialistic. But interpreted in human experience, they are of infinite value. Shorter workdays and better conditions of work mean better health, better physical conditions, better bodies and better minds —things that are essential to the best mental development of life and the greatest creative ability. Higher wages mean better food, better clothing, better housing, better surroundings, and opportunities that are essential to mental development.

"There is nothing unimportant about the material necessities for living. These things become a part of the body, a part of the brain, hence a part of the mental and spiritual life of the workers. Nourishing food means sustained life and better life. Minds and hearts can not be sustained without nourishment. In connection with this, attention ought again to be called to the remarkable trenchant statements of Major-General Gorgas in an interview made public some weeks ago. That practical scientist expressed the effect of wages in the following human values:

" 'Add to the laboring man's wage from $1.25 to $2.50 a day, and you will lengthen the average

American's thread of life by thirteen years at least.

" 'The rich are overeating. The poor are undereating. Both are contributing to short lives. But where overeating shortens the life of one person in one hundred, undereating shortens that of ninety-nine. If we are to lengthen the average life, we must pay attention to the poor man.' "—*American Federationist*, November, 1915.

✠

Common Causes of Accidents.—"In a recent bulletin issued by the Central Safety Committee of the Commonwealth Steel Company, the principal causes of the accidents occurring in the plants of that Company in the period from January to June, 1915, are given as follows:

Sprains, heavy lifting, etc.	10
Handling heavy objects	8
Dropping handled objects	8
Small tools used by injured	6
Slipping, stumbling, etc.	4
Handling light objects	4
Cuts, scratches from rough edges, splinters, etc.	3
Falling objects	3
Stepping on nails	2
Bad piling of material	2
Flying chips, shavings, etc.	1
Particles in eyes, not wearing goggles	1
Burns, hot substances	1
Nails in core sand	1
Jib crane slings	1
Circular saws	1
Bruises from goggles	1
Total	57

According to the Safety Committee, not one of these fifty-seven accidents was due to a lack of protection by mechanical safeguards but to careless practices on the part of workers, who are urged to coöperate with the Company in eliminating these causes of preventable accidents.—*Safety Bulletin*, American Museum of Safety, November, 1915.

✠

Carelessness.—The Central Safety Committee of the El Paso and Southwestern System issued to its employees a circular, the text of which is given below:

Who Comes Here?

I am more powerful than the combined armies of the world.

I have destroyed more men than all the wars of the world.

I am more deadly than bullets, and I have wrecked more homes than the mightiest of siege guns.

I steal, in the United States alone, over $3,000,000,000.00 each year.

I spare no one, and I find my victims among the rich and poor alike; the young and old; the strong and weak; widow and orphans know me.

I loom up to such proportions that I cast my shadow over every field of labor from the turning of the grindstone to the moving of every railroad train.

I massacre thousands upon thousands of wage-earners in a year.

I lurk in unseen places, and do most of my work silently. You are warned against me, but you heed not.

I am relentless. I am everywhere; in the home, on the streets, in the factory, at railroad crossings, and on the sea.

I bring sickness, degradation and death, and yet few seek to avoid me.

I destroy, crush, maim, take all and give nothing.

I am your worst enemy.

I am Carelessness.

Personal Notes

Dr. Haven Emerson has been appointed Acting Commissioner of Health of the City of New York to succeed Dr. S. S. Goldwater who recently resigned.

Dr. Otto R. Eichel has recently been appointed director of the Division of Sanitary Supervisors in the New York State Department of Health. Doctor Eihel has been with the department for somewhat over a year now. He was formerly chief of the Division of Tuberculosis in the Buffalo City Health Department.

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Massachusetts Medical Society.

Papers on Public Health and Preventive Medicine.

Infant Mortality. J. L. Morse.
Control of Typhoid Fever. M. W. Richardson.
Preventable Heart Disease. R. I. Lee.
Contagious Diseases.

No. 6.

Treatment of Eczema with Special Reference to the Use of Vaccine and the Part Played by Bacteria in Its Etiology. Report of Cases. L. S. Medalia.

No. 10.

Scope of Public Health Service. W. C. Hanson.

No. 13.

Case of Epidemic of Typhus Imported into Central New York. I. T. Levy, J. L. Kanton.

No. 14.

Child and Community. E. O. Otis.

No. 15.

Our Criminal Problem from a Standpoint of Classification and Segregation. E. R. Spaulding.

American Journal of the Medical Sciences.

CL, No. 3. September, 1915.

Statistics of Age Mortality Based on the Number of Persons Alive at Each Age. C. M. Montgomery.

American Journal of Diseases of Children.

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Chemical Study of Woman's Milk, Especially Its Inorganic Constituents. L. E. Holt, A. M. Courtney, H. L. Fales.
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XXVI, No. 294. August.

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Foreign Bodies in the Throat. Thomas McS. Barrett.
Inherited Effects of Chronic Lead Poisoning. Editorial.
Tuberculosis and Immunity. Editorial.

No. 14. October 2.

Objectionable Features of Garbage Disposal. Editorial.

No. 16. October 16.

A Discussion of the Cancer Mortality. Frederic V. Beitler.
The Problem of Rural Health Administration. Editorial.

No. 17. October 23.

The Efficiency of Various Antityphoid Vaccines. Wilbur A. Sawyer.
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No. 18. October 30.

Relation of the Hospital to the Community. Winford Smith.
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No. 3. September.

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Industrial Hygiene. J. W. Scherescbewsky.

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Lung Capacity of Children. C. W. Stiles, Floyd Graves.

No. 43. October 22.

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The Prevalence of Pellagra. Josepb Goldberger, D. G. Willets, C. H. Waring.

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No. 4798. August 14.

Treatment of Wounded by Vaccines. H. L. Tidy.
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Common Aims of Science and Humanity. A Schuster.
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No. 10, No. 371. September 4.

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No. 30. July 29.

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No. 34. August 23.

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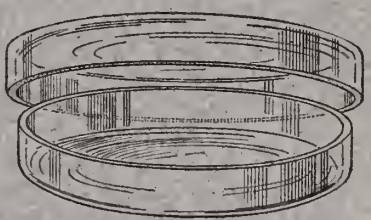
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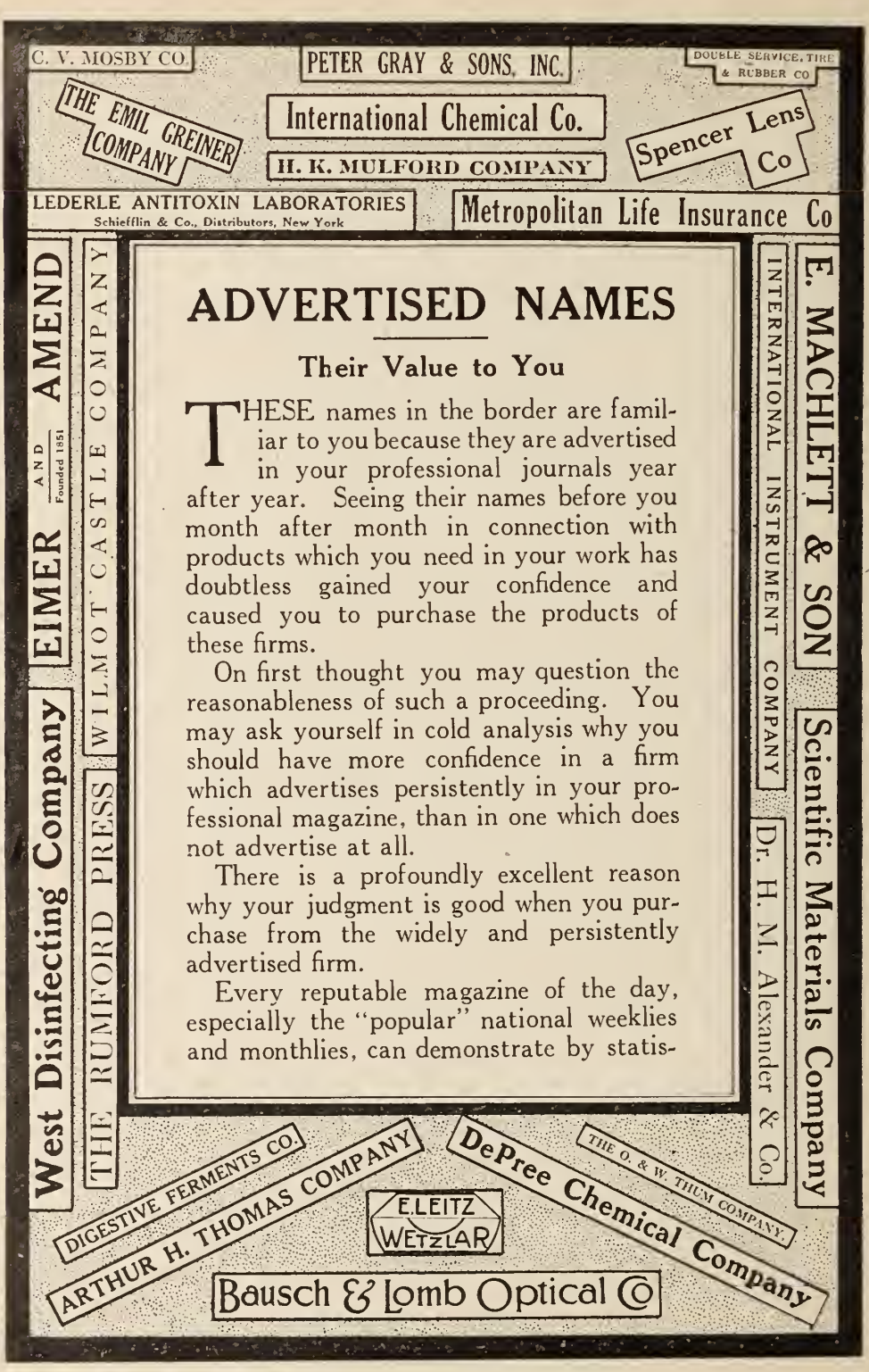
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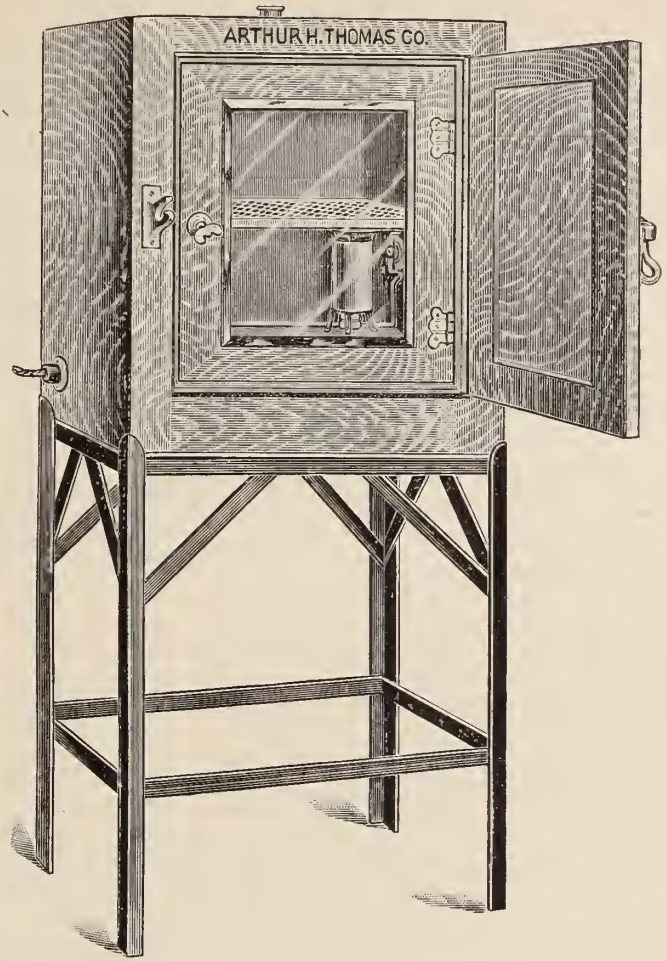
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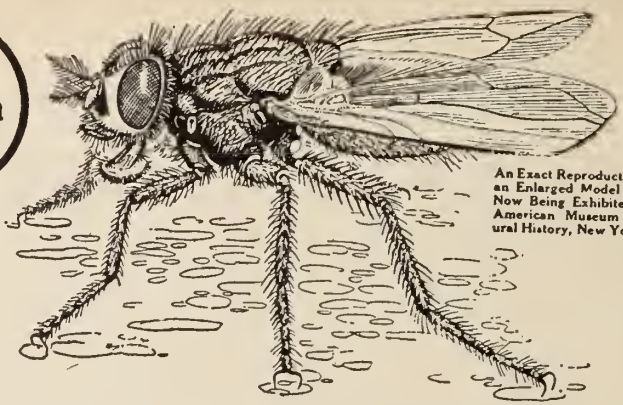
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VOLUME V.—OLD SERIES, VOLUME XI. SEPTEMBER, 1915. No. 9.

Contents

PAGE

The Degeneration of Life 811
William J. V. Deacon, State Registrar of Vital Statistics, Kansas.

A Study of Methods of Sewage Disposal in Industrial and Rural Communities and Suggestions for Their Improvement 820
J. F. Siler, Captain Medical Corps, U. S. Army; P. E. Garrison, Past Assistant Surgeon, U. S. Navy, and W. J. MacNeal, Assistant Director of Laboratories, N. Y. Post-Graduate Medical School, New York.

The Fate of Bacteria in Frozen Meat Held in Cold Storage, and Its Bearing on a Bacteriological Standard for Condemnation 833
John Weinzirl and E. B. Newton, University of Washington, Seattle.

Experiences with Refuse Collection and Disposal with Reference to Odors 835
Samuel A. Greeley, Chicago, Ill.

Wound and Skin Diphtheria as a Public Health Problem 838
Leverett Dale Bristol, M. D., Professor of Bacteriology, University of North Dakota; Director of the State Public Health Laboratories, University, North Dakota.

A Proposed American Public Health Association Course of Study for Health Officials and Others Interested in Public Health Work 843
Frederick D. Bell, New York City

Editorial 848

Accidents Following Vaccination 850
W. F. Elgin, Glenolden, Pa.

The Protection and Maintenance of the Public Health During and Subsequent to a Great Conflagration 858
William C. Hanson, M. D., State Department of Health, Boston, Mass.

A Bacteriological Method for Determining Manural Pollution of Milk 862
John Weinzirl and Milton V. Veldee, University of Washington.

A Note on Uhlenhuth's Method for Sputum Examination for Tubercle Bacilli 867
J. J. Kinyoun, M. D., Ph. D., Bacteriologist, Health Department, D. C.

Bureaus of Water Supplies 871
Edward Bartow, Director of the Illinois State Water Survey, University of Illinois, Urbana, Ill.

Danger to Laundry Workers of Infection from the Handling of Soiled Linen 875
Ebba Almgren Dederer, M. D., Committee of Occupational Diseases of Woman's Department of the National Civic Federation.

Municipal Health Officers and Venereal Disease 884
Dr. W. A. Evans, Health Editor, Chicago Tribune.

A Portable Air Sampling Apparatus for the Collection of Large Volumes 901
E. W. Brown, P. A. Surgeon, United States Navy.

Refuse Disposal in Southern Cities with Particular Reference to Savannah, Ga., and Its New Incinerator 904
E. R. Conant, City Engineer, Savannah, Ga.

Report of the Committee on Water Supplies of the Sanitary Engineering Section 918
Francis F. Longley, Chairman.

Progress Report of the Committee on Sewerage and Sewage Disposal 927
Sanitary Engineering Section, American Public Health Association.

Report of the Committee on Refuse Collection and Disposal 933
Sanitary Engineering Section, American Public Health Association.

Progress Report of Committee on Sewage Works Operation and Analytical Methods 935

Book Reviews 944

Personal Notes 946

Health Department Reports and Notes 947

Public Health Notes 956

Industrial Hygiene and Sanitation 962

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[1] Elliotson: The Lancet, 1830, II, 370.
[2] Dunbar: Zur Ursache und Specifischen Heilung des Heufiebers, Muenchen, 1903.
[3] Noon: The Lancet, June 10, 1911, 814.
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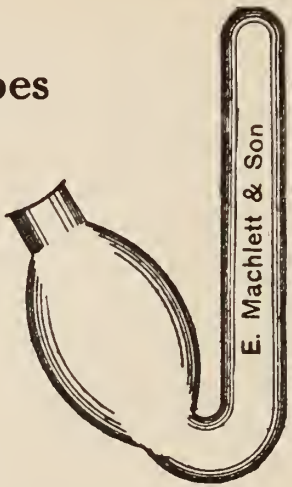
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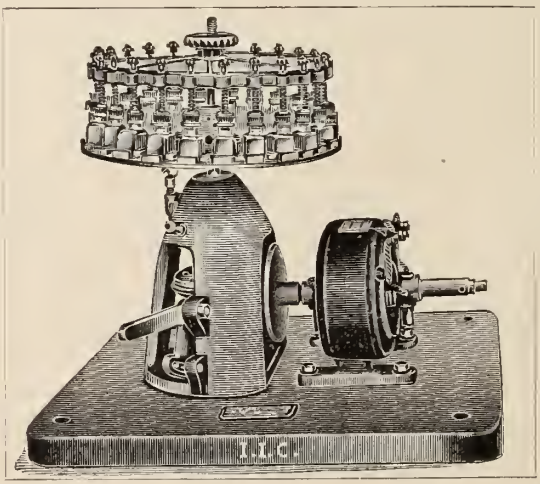
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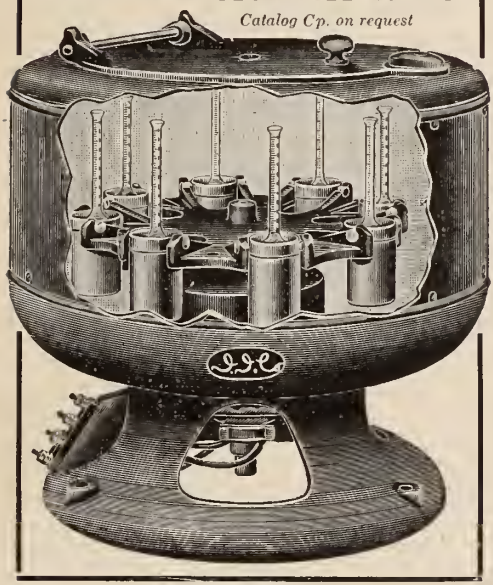
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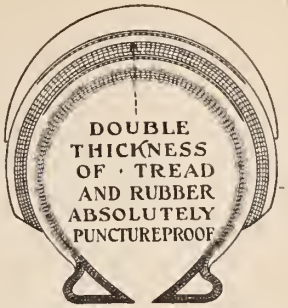
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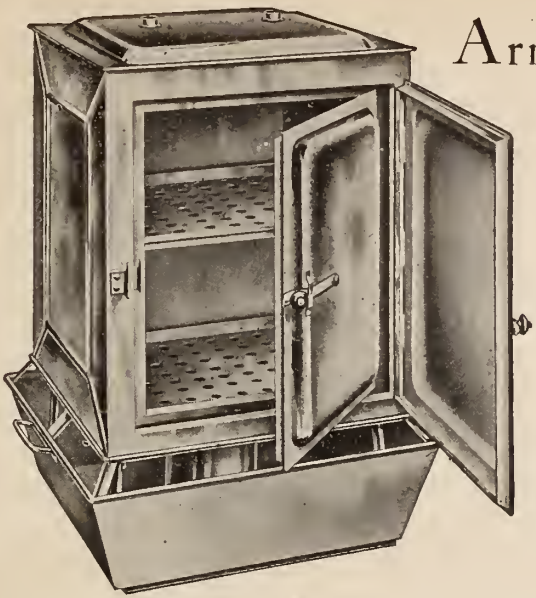
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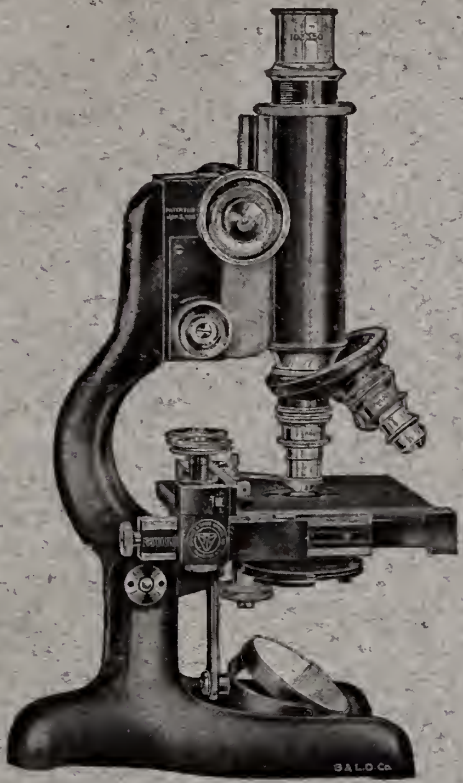
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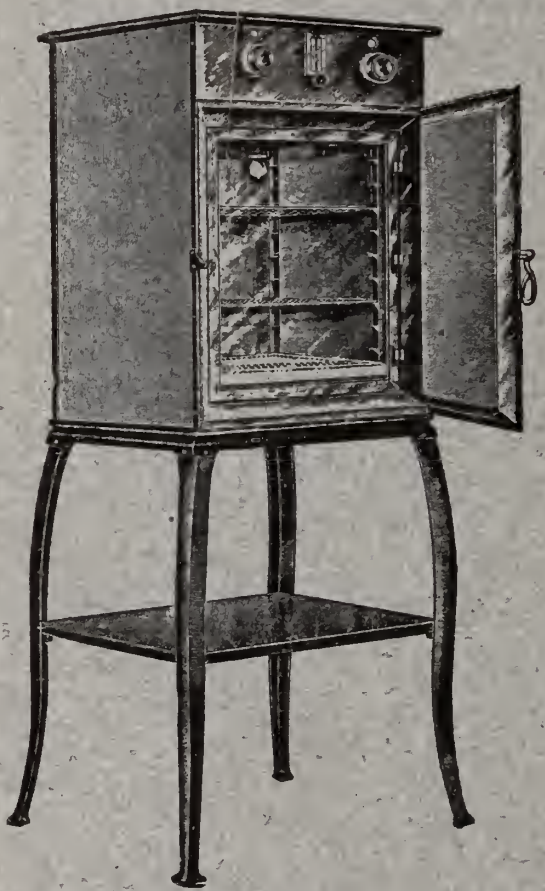
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